For producers of Sand, Gravel, Crushed Stone, Slag, Cement, Lime, Gypsum, and other nonmetallic minerals

JANUARY 1958

PIT and QUARRY

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The Lodge-Davison Expressways and Interchange Area in Detroit, Mich., During Construction.

ANNUAL REVIEW & FORECAST ISSUE

Over four years without overhaul using Cities Service C-300 Motor Oil!

When Northwest Sand and Gravel's pit of earth suddenly became a lake, it didn't drown out the company's operation or its spectacular performance results.

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pit and quarry

THE BASIC MAGAZINE · IN A BASIC INDUSTRY

JANUARY 1958 **Vol. 50 No. 7**

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• The Lodge-Davison expressway interchange in Detroit, Mich., shown on our cover, as it appeared before completion, is an example of the outstanding highway engineering and construction efforts being expended throughout the 48 states. No less outstanding, and in fact no less critical to the successful prosecution of the highway program, are the efforts, the men, and the machines that producers in the pit-and-quarry industries are bringing to bear in order to provide the basic necessity—aggregates. The roads of tomorrow will be, at the least, a deserved testimonial to the effectiveness of the men and plants in our fields.

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel, Slag and other nonmetallic minerals.

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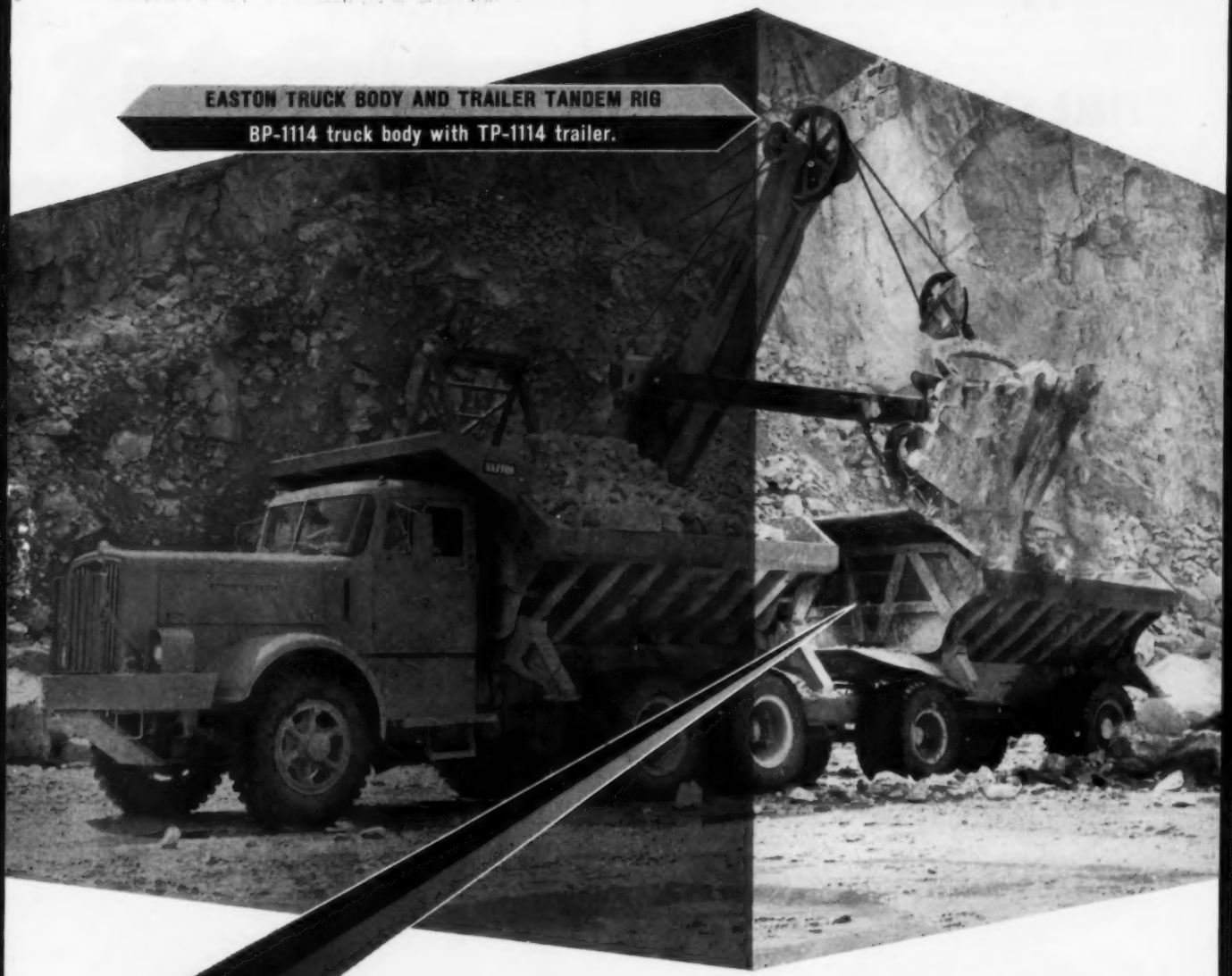
To subscribers: When requesting change of address, kindly send old as well as new address.

PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX



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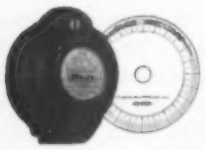

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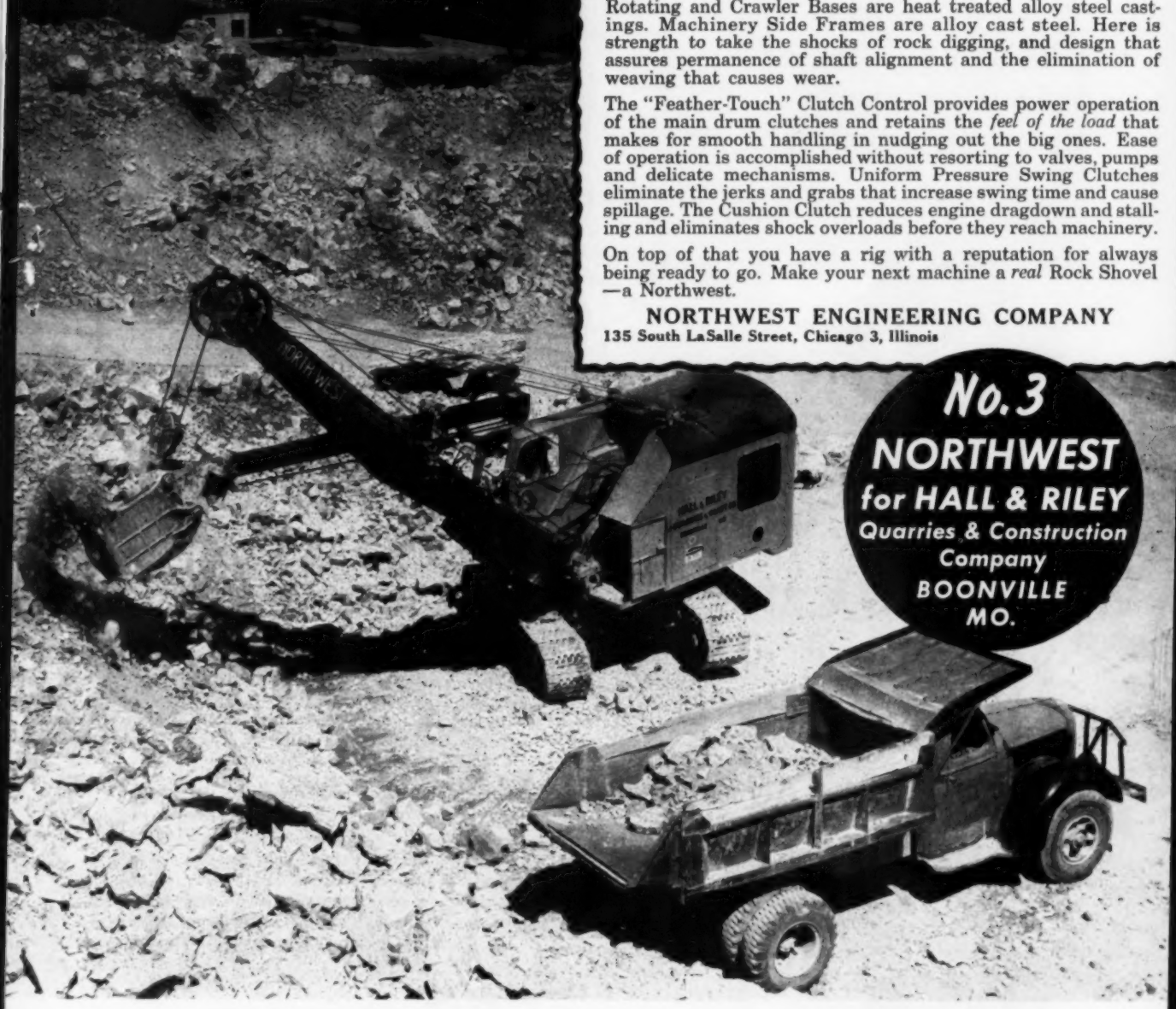

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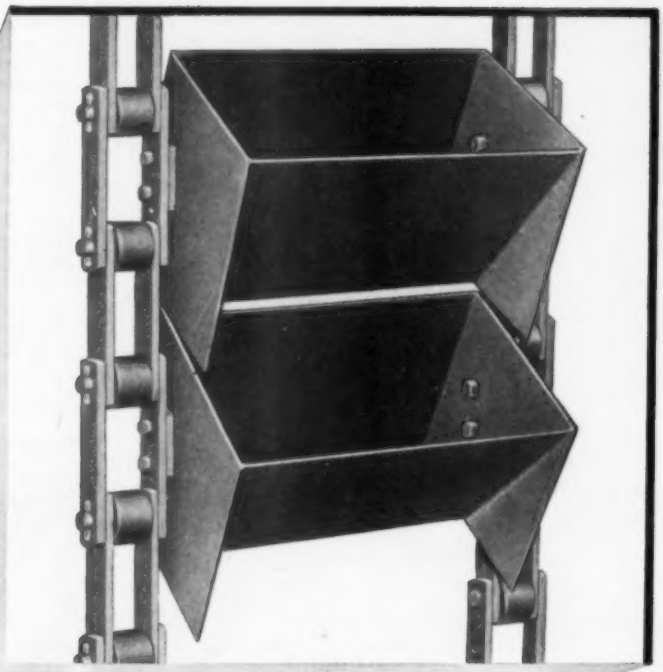

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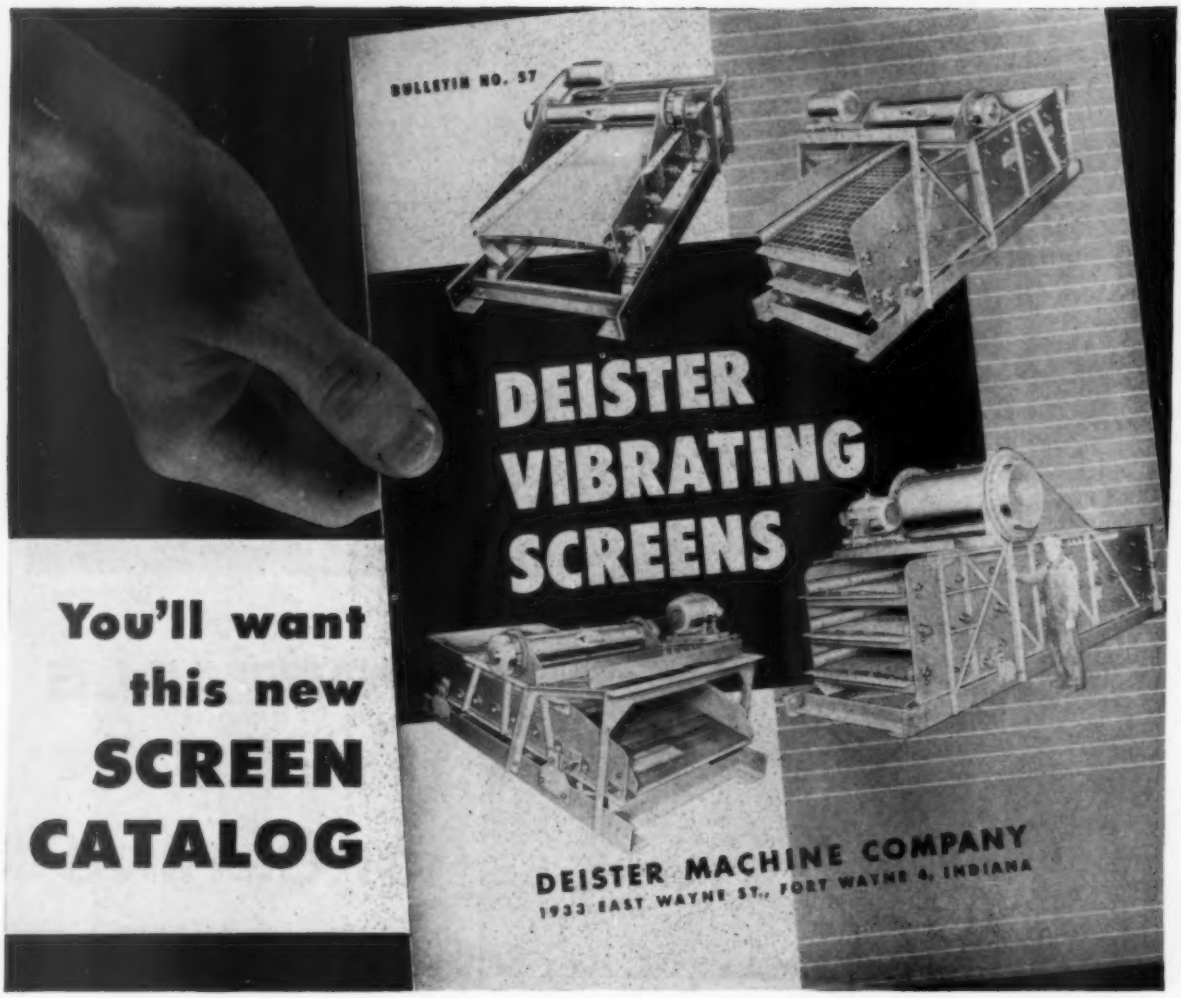
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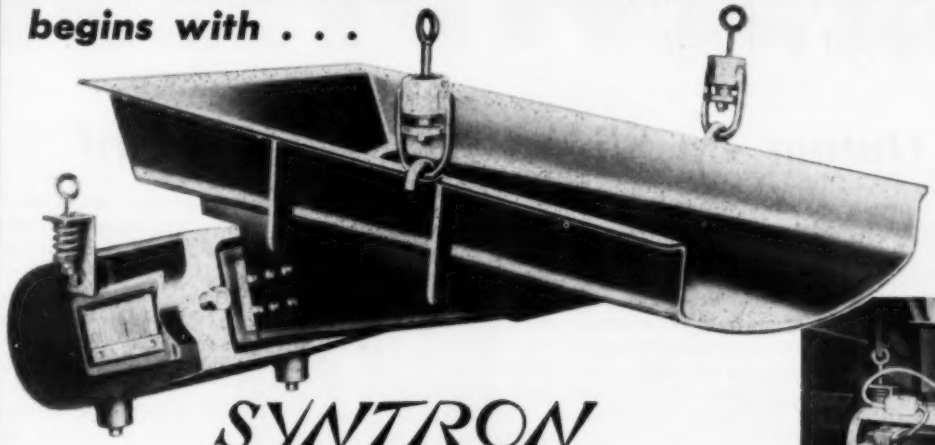

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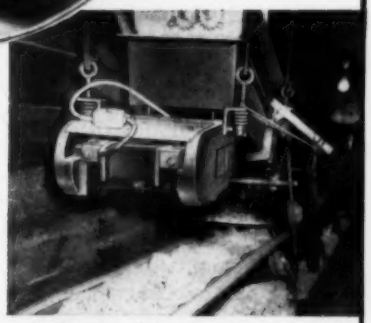
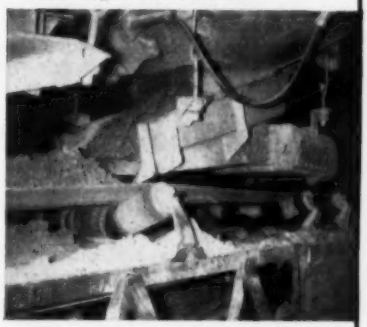


Feeding run-of-pit rock to conveyor belt
Note: large rock and fines



Feeding damp sand to conveyor belt
Note: SYNTRON Vibrator on sand hopper

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The Editor's Page

1957 Output Up Slightly for New Record

THE nonmetallic minerals industries covered by PIT AND QUARRY collectively had another record year in 1957, but apparently by a smaller margin than in other recent years. Prospects for 1958 are for another slight increase in the volume of construction, with the demands for the road program beginning to be strongly felt toward the end of the year. This is expected to carry the aggregates industries to new highs in demand. The demand for cement is expected to increase, but not beyond the 1956 all-time high, and the other nonmetals should, together, reach a new peak.

The above information is obtained from the Review and Forecast Section of this January, 1958, issue, in which we are again attempting to provide our readers with the latest and most complete information available on conditions in the nonmetallic mineral industries, on developments affecting them, and on prospects for the future. To this end we have assembled all available information from government and other sources, from our records, and from questionnaires sent to thousands of producers in this field. Only by means of such questionnaires is it possible to determine conditions in these industries, as in most cases government data lags several years behind.

Review The partial information available at this time makes it certain that 1957 was another record year for these industries, collectively. This record, however, was apparently not due to an increased volume of construction, as it has been in recent years, but more to the increased demands from chemical and manufacturing industries and other users.

The aggregates industries—including sand and gravel, crushed stone, and slag—at least held their own, cement was down slightly, and the other nonmetallics were up on the average. The big disappointment of the year was the fact that the demand for materials for the expanded road program did not come up to the over-optimistic expectations.

According to the best authorities, the dollar volume of new construction in 1957 was about $47,200,000,000, about 2 percent over the 1956 record. An estimated $18,000,000,000 was spent for maintenance and repair. The total of $65,200,000,000 was almost 2 percent over the 1956 record total, but this gain was more than offset by an increase in construction costs. Only a continued lag in private housing construction kept the actual physical volume of construction from setting a new record.

The portland cement industry, after ten consecutive record-breaking years, suffered a slight but obviously temporary setback in 1957. Bureau of Mines records are available for only the first ten months of the year, but with estimates for the remainder, we believe that production was down about 5 percent, and shipments about 5 percent. Due to price increases during the year the value of shipments probably set a new record. The totals for the year are estimated at about 300,000,000 bbl. produced 293,000,000 bbl. shipped, and nearly $1,000,000,000 in value.

Our information on the production of sand and gravel and crushed stone in 1957 should be fairly accurate as it is based on the 1954 Mineral Industries Census data which became available about a year ago. Estimates on 1955, 1956, and 1957 output are projections of census figures on the basis of information received in our questionnaires.

Our estimates indicate that the sand and gravel industry in 1957 produced about 625,000,000 tons, equalling the 1956 record high, also estimated. These figures include both commercial and non-commercial production and industrial sand.

Crushed stone production in 1957 is estimated at about 420,000,000 tons, an increase of about 5 percent over the record 400,000,000 tons (also estimated) produced in 1956. These figures include both commercial and non-commercial production, as well as agricultural limestone, but not the stone used in cement and lime manufacture. The production of agstone is believed to have gone up about 9 percent in 1957 to about 23,000,000 tons.

The production of iron blast-furnace slag in 1956 was 35,000,000 tons, a new record. As the industry now processes practically all the slag produced, output is limited by steel production, but the steel strike apparently had little or no effect on output. There was no such interference with production in 1957; but there may have been a falling off in demand, with the result that slag output probably approached but may not have exceeded the all-time record set in 1956.

There is no recent information on lightweight aggregate production but this is estimated at about 17,000,000 tons in 1957, somewhat below the 1956 record level.

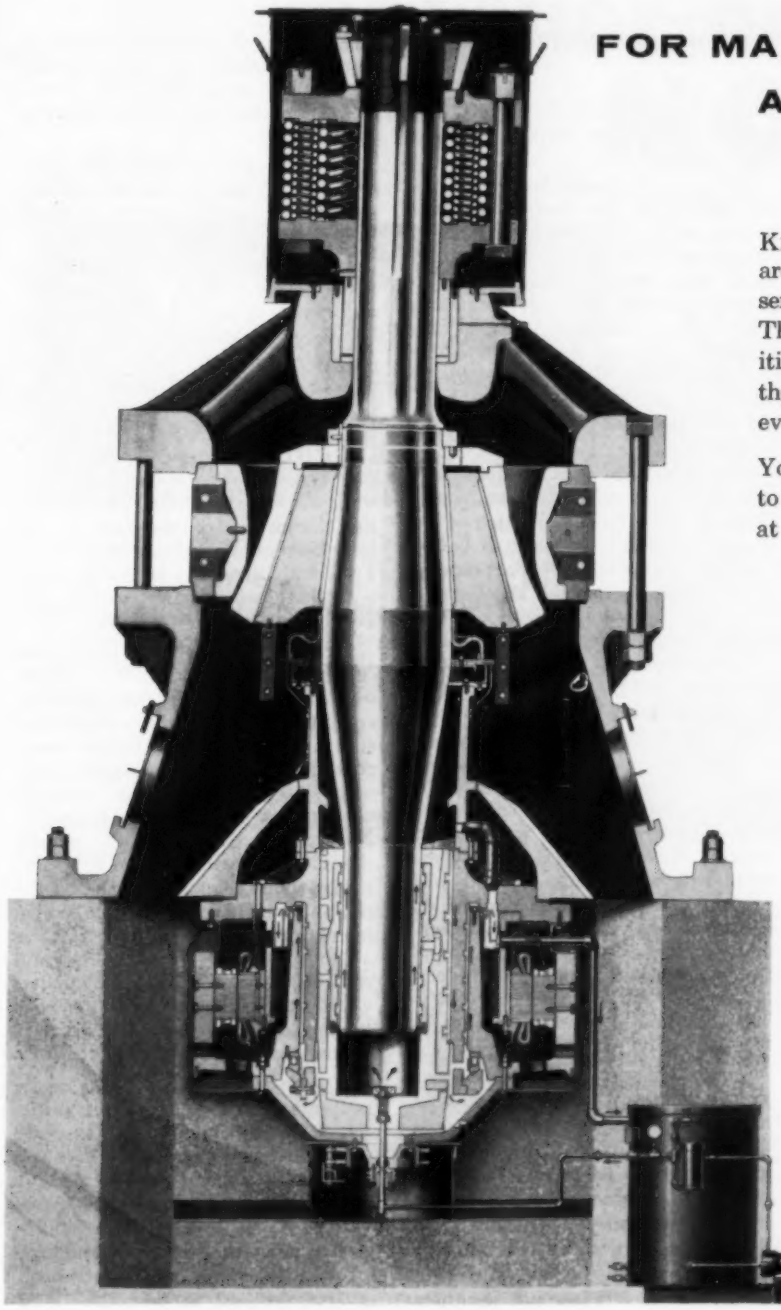
The other nonmetallic minerals not mentioned above apparently set a combined record, although individually some of them did not reach previous high marks. Lime almost certainly set a new record by a small margin, and others showed increases over a year ago. Gypsum, sulfur, fluorspar, and a few others apparently dropped off slightly.

Forecast All authorities seem to agree that construction in 1958 will set another new record in dollar volume. New construction estimates average $49,600,000,000, and maintenance and repair should at least hold the 1957 level of $18,000,000,000, for a total of about $68,000,000,000. Actual construction volume (expenditures adjusted for price changes) is expected to be up slightly from 1957, also for a new record. Most of this gain is expected to come from residential building, both private and public, and from highway work. Declines are expected in private industrial plants and military facilities; all other major types of construction are expected to show little change.

These construction estimates indicate modest increases in demand for aggregates and cement in 1958. Aggregates should set new records, and cement should approach the 1956 all-time record. Most of the other nonmetals should at least equal 1957 figures. As a result, the PIT AND QUARRY industries as a whole may have another record year.

Walter E. Trauffer

KENNEDY



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Washington News Letter

By S. HERBERT UNTERBERGER

ASK ANYONE in Washington who is connected with the tax problem what he thinks about the possibility of a tax cut next year, and you are likely to see a startled expression on his face, and hear him say something to this effect: "Not a chance." In past years, too, the more realistic analysts would have provided the same answer; but, there is always a reasonable number of people who have hope, although, for the most part, those hopes have been regularly doomed.

This year, of course, the new element which makes a budget and tax cut a virtually hopeless ambition are the dramatic and awesome developments in the field of missiles. Even before the Russians put their first satellite into its orbit, the figures indicated the possibility of so small a surplus that a tax cut was problematical indeed.

Against an estimated income of $73,500,000,000, the Budget Bureau was estimating expenditures of $72,000,000,000—$38,000,000,000 of military expenditures and $34,000,000,000 of other spending. This would have left a surplus of only $1,500,000,000. Past experience has shown that unforeseen requirements would generally consume all or most of this amount. Even if it were all available, a tax cut just sufficient to reduce government income by that amount would have been too insignificant to be worth the trouble.

Because of the developments of the last couple of months, the official estimate has already risen by $500,000,000 for military spending. The unofficial estimate of large numbers of people around Washington is that the increase is likely to be more in the area of a billion dollars. This would practically wipe out even the estimated surplus.

On the other hand, there is great fear that, because of the recent declines in business activity, government income will not reach the estimated $73,500,000,000. Here, again, it is unofficially estimated that government income may fall short by as much as a billion dollars. If expenditures rise by $1,000,000,000 and income falls by $1,000,000,000, there will not only be no surplus but, indeed, a deficit.

Hearings are already being held by the Bureau of the Budget for the purpose of establishing the monetary request to Congress for the coming fiscal year, that is, July 1, 1958, through June 30, 1959. Despite much brave talk, a realistic appraisal of the situation, at least at this moment, appears to offer no possibility for a decline in expenditures, but, rather, the likelihood of quite substantial increases.

This likelihood was substantially increased as a result of the recent dramatic failures in our attempt to launch a satellite. While it is being repeated everywhere that money alone cannot accomplish this feat, it is equally obvious that without adequate expenditure the situation is quite hopeless. The clamor for results is so great that the demand for funds to achieve them is quite irresistible.

In this connection, the Administration and the nation have probably been very fortunate that the satellite incidents have occurred during a period when Congress was not in session. When Congress reconvenes, there will be no lack of loud and strident voices demanding all kinds of unreasonable things. It is generally regarded as a certainty that some heads will go on the chopping block to appease this political necessity. The question being discussed is, "Whose head?"

In an odd sort of way, this situation is unique. Usually it is possible to dispose of a few politically appointed officials, and the appeasement has been achieved. Now, the "blame," if any, is distributed broadly between the Congress and the Administration. And within the Administration, it is again distributed between officials and scientists. The fact that scientists are involved makes the difference. It would be a new departure for Congress to start investigating the professional qualification of the scientists employed. Nor are there many Congressmen truly qualified to conduct such an investigation. If this were attempted, one could expect that the scientists would close ranks, and little, if any, real information would become available.

Actually, there is little that Congress can do but provide the money, and this is exactly what it is likely to do.

If only money were needed to advance an already going missile program, it is possible that this could be swung even within the normal budget magnitudes. The problem, of course, is more fundamental than this. What is really up for discussion is the whole system of American education. This has been discussed and re-discussed for many years, at least since the end of World War II. But the discussions of the last decade have been on a more superficial level. Frequently they have been concerned with questions of more schoolhouses and higher pay for teachers.

Here, too, a new and important feature has been added. In addition to the above matters, an agonizing re-appraisal of our whole educational system is beginning to be made. Again, it is highly questionable whether Congress has the technical competence to evaluate this matter. Nevertheless, it is virtually certain that Congress will be asked to appropriate funds to pay the bill for the re-appraisal, and also for the implementation of further steps. This is a "longer-range" proposition and could turn out to involve far greater expenditures than even the increases in the military budget currently contemplated.

This fact denies the validity of the proposition that the key to tax reduction is to cut back the swollen level of non-defense spending. There is a school of thought represented in Washington which acts on the apparent belief that this is a real possibility. Analysis of the situation indicates strongly that these people are probably "whistling in the dark." Although not quite half of the money spent by the Federal Government is for so-called non-defense purposes, many of these items have a defense aspect, and even those which do not are generally untouchable.

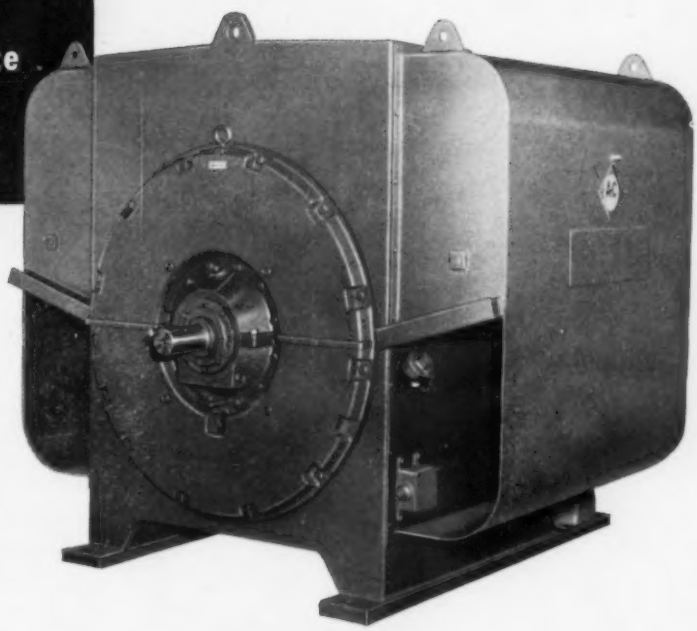
(*Continued on page* 137)

Eliminate costly enclosures with Allis-Chalmers

weather-protected MOTORS

Modern features

cut operating, maintenance expense . . . give MORE dependability



Here's a newly designed line of Allis-Chalmers weather-protected motors with the ability to "take" outdoor conditions. This means no expensive protective enclosures are needed . . . a big saving in plant or installation building costs.

Designed to meet defined NEMA requirements, these motors incorporate many important features which assure dependable outdoor operation:

- **Ventilating System** — Low velocity intake, vertical lift, change of direction and high velocity discharge of ventilating air keep rain, snow, sleet, dust and dirt out of vital parts.
- **Removable Air Ducts** — To facilitate inspection and maintenance of interior air passages, air intake ducts are designed for quick removal.
- **Stator Assembly** — Removable as a unit, it simplifies maintenance and minimizes downtime.
- **Split Sleeve Bearings** — Capsulized design permits access to motor interior without disturbing the bearings or their enclosures. Positive vapor seal is used on high-speed motors. Antifriction bearings are available for slow speed motors.
- **Proven Insulation** — Famous Allis-Chalmers insulation systems (Class A and B) are available. And, for extreme temperatures, or where high resistance to abrasion and moisture is required, Allis-Chalmers can provide the revolutionary *Silco-Flex* system.

Silco-Flex is an Allis-Chalmers trademark.

THIS DESIGN available in ratings from 250 to 900 hp. Other designs in larger horsepower ratings are also available. Contact your A-C sales office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin. Ask for Bulletins 51B8606A and 05B7894.

A-5292

ALLIS-CHALMERS

NATIONAL ELECTRICAL WEEK
FEB. 9-15, 1958

TEXACO LUBRICANTS SPEED

Aggregate production is tough on equipment. Dust, dirt and just plain axle-snapping work make the protection of engines, hydraulic circuits and exposed equipment critically important.

To help keep aggregate production on schedule and maintenance costs low—plant operators can protect these areas with three specialized Texaco lubricants:

Texaco Ursa Oil to lubricate engines . . . It keeps engines clean, prevents wear and rust, helps engine bearings withstand high heats and pressures.

Texaco Regal Oil R&O to improve hydraulic operation . . . It keeps systems clean, free of rust, sludge and foam. Assures efficient operation in any weather. *Texaco Crater X Fluid to fortify wire rope and open gears against destructive forces* . . . It keeps rope strong longer—lubricates and protects gears and

LUBRICATION IS A MAJOR

(PARTS, INVENTORY, PRODUCTION

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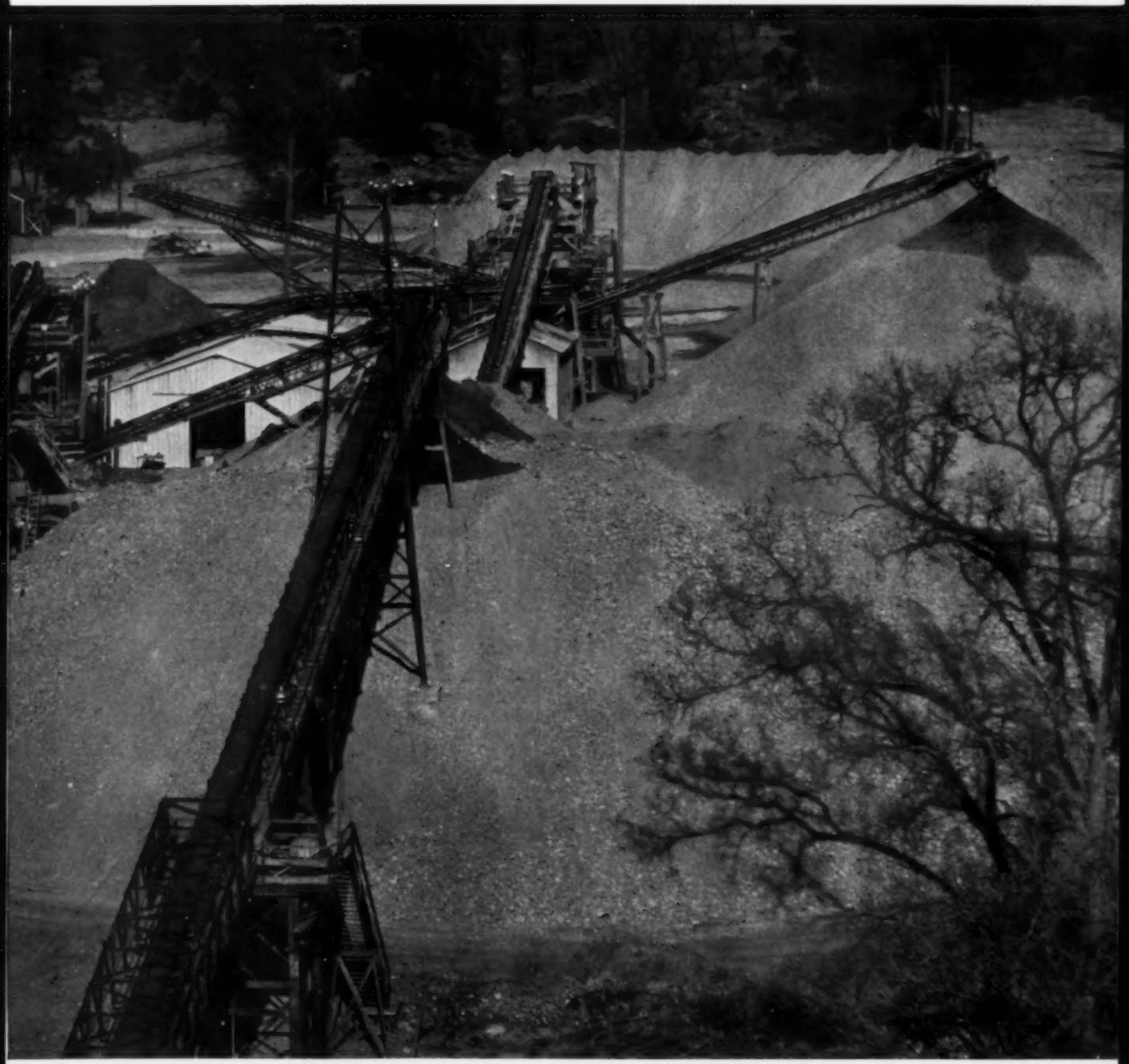

AGGREGATE PRODUCTION

equipment exposed to year round weather.

These lubricants are part of the famous Texaco Simplified Lubrication Plan, which lets you handle *all* major lubrication with no more than six lubricants. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States. Or write:

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1. 3 TIMES MORE PROTECTION AGAINST SIFTING!

With exclusive new Staggered Flap construction, end flaps of the bag overlap not just once, but three different times to seal bag ends completely! Result: St. Regis Super Stepped-End Bags give you 3 different guards against siftage . . . 3 times more effective protection against product loss . . . *cleaner* bags!

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No inner ply cut-out corners to weaken the bag! With new Staggered Flaps, St. Regis is first to give you extra protection against siftage plus maximum strength in all four corners. Most important of all, St. Regis Super Stepped-End Bags give you the advantage of complete product protection. Since corners are not cut out, only the sheet designed for the job touches the product!

Stepped-End Bags were invented and developed by St. Regis. To date, more than 200 million have been bought by industries looking for better packaging. For a full demonstration of this important new development—the Super Stepped-End Bag—call your St. Regis representative today!

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Queen of the big shovels

55-CU.-YD. DIPPER makes a bulldozer look small. The Tiger Brand Wire Rope is 2⅝" in diameter.

THE RIVER QUEEN, largest shovel ever built by Bucyrus Erie. Now operating in the River Queen mine near Central City, Kentucky. The mine is owned jointly by W. G. Duncan Coal Co. and Peabody Coal Co. It is operated by Peabody.

can move 100,000 tons daily

with "muscles" of Tiger Brand Wire Rope

IN LESS THAN A MINUTE, the River Queen can scoop up an 80-ton bite of rock and earth, pile it 295 feet away and be ready for the next bite. That's fast digging!

The River Queen is the largest power shovel that Bucyrus Erie has ever built. It has a 55-cubic-yard dipper and is as high as a 13-story building.

The wire ropes that harness the tremendous power of the shovel are all U.S.S. American Tiger Brand. The two twin-reeved hoist ropes are 2⅝"-diameter, 6 x 49 Lang Lay Monitor Excellay with Independent Wire Rope Core. The two twin-reeved crowd ropes and the single twin-reeved backhaul rope are of the same size and construction.

The boom supports are eight in number for a total length of approximately 952 feet. These are 2½" Galvanized Boom Support Strands of special design for long service life.

The fact that all the wire rope applications on this huge shovel are handled by standard Tiger Brand constructions emphasizes the quality of the engineering that goes into the complete line of Tiger Brand Wire Rope.

THE BIG BOOM is 145 feet long and is supported by eight 2½" Tiger Brand Boom Supports. Note also the two twin-reeved hoist ropes in foreground.

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The right wire rope will do the trick!

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The Meckum Jigs' high acceptability and performance is proven as the jigged aggregates meet increasingly rigid 'specs' with ease, enabling you to obtain new contracts and greater profits. With amazing simplicity and low cost of operation, Meckum Jigs produce premium quality concrete aggregates for only a few pennies per ton.

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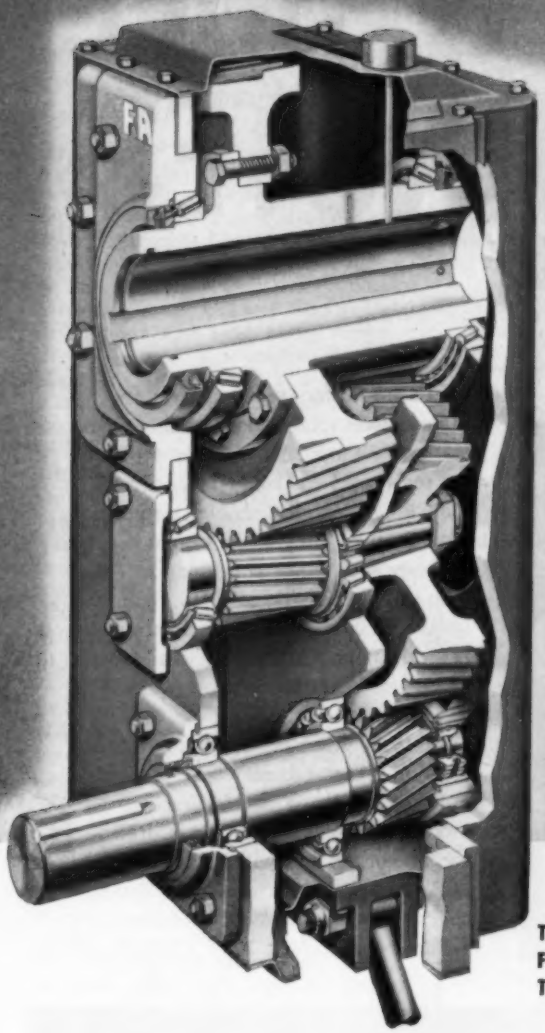
New...LARGER...ALL-STEEL!

-the FALK 315J Shaft Mounted Drive

- **for higher horsepower**
- **for lower output speeds**



THE NEW 315J...
FROM 2 HP AT 5 RPM
TO 50 HP AT 359 RPM

Check These Features

New — 3-wall, one-piece housing provides double the ability of cast iron to withstand external impact or shock loads.

New — ratio range—5:1, 14:1 or 25:1. Higher ratio range makes possible lower output speeds...smaller sheaves...standard, rather than slow-speed, motor.

New — ease of maintenance. All revolving elements can be easily replaced in the field, on the jobsite! Inspection covers permit quick inspection of gears and bearings. Dipstick provides quick check on lubricant.

New — longer center distance between shafts allows use of larger sheave on input shaft. Unit may be mounted with input shaft next to driven machine, and with motor mounted directly under driven shaft.

PROMPT DELIVERY

Standard units are available for off-the-shelf shipment from factory, warehouse or distributor stock.

LET US HELP YOU

Your Falk Representative or Authorized Falk Distributor will gladly review your applications and offer suggested selections—without obligation.

Write for Bulletin 7100

The new Falk 315J also gives you these famous Falk advantages—

- Falk extra-depth, extra-capacity gear teeth—plus the extra efficiency (98½% per gear mesh) of helical gears for maximum power utilization.
- Through-hollow shaft design for easy installation, with internal groove to permit use of bearing puller when dismounting unit. Hollow shaft also permits use of unit on through-shaft applications.
- Tie rod fastened to steel housing by steel bracket with bolt in double shear. Shock load on tie rod will not damage housing.

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New Deep Hole Combination Drills

10 FEET OF 3" HOLE EVERY 7 MINUTES

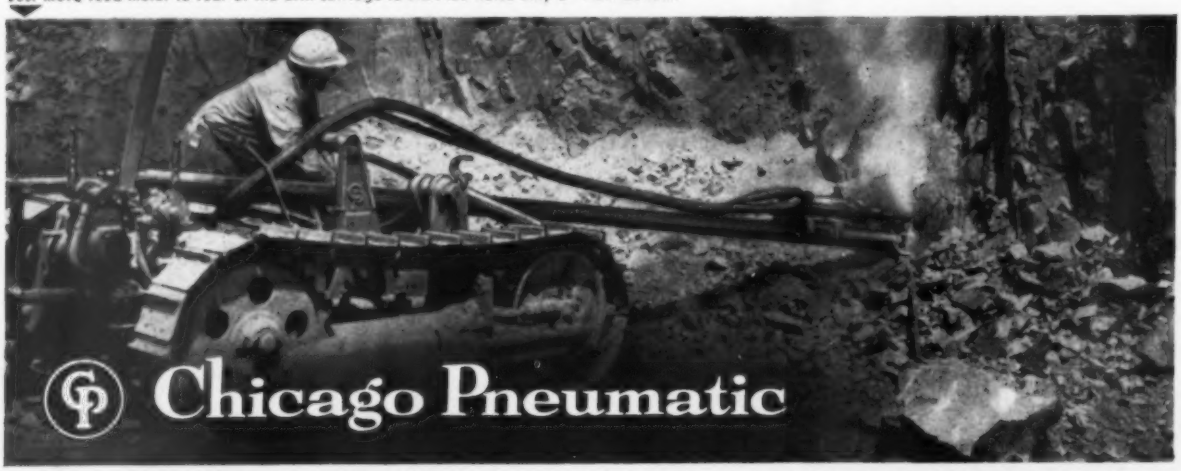
in Hard Trap Rock!

Drill controls stay within easy reach for drilling top holes.

And using 10 foot sectional rods on 40 foot holes total elapsed drilling time was only 34 minutes! We've teamed-up the self-propelled G-800 Tracdril and the CP 4½-inch Reversible Deep Hole Drill to give you the best in mobility and drilling performance. You can inch the Tracdril into tight spots with ease. It takes tough terrain in stride without "bull work" and tows its own compressor up steep grades.

Tops in its class, the CP-450DR Deep Hole Drill hits hard, has powerful rotation that stands crowding. Cleans hole with jet air. With this Tracdril-mounted deep hole rig you can drill toe hole or top hole with equal ease. Ask your equipment dealer for details. *Chicago Pneumatic Tool Company, 8 East 44th St., New York 17, N. Y.*

Just move feed motor to rear of the drill carriage to start toe holes only 6" from bottom.



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News of the Industry

Lone Star Cement Corp. Opens $14,000,000 Plant Near Lake Charles, La.

Lone Star Cement Corporation's $14,000,000 plant, capable of an annual production output of 2,000,000 bbl., was recently opened southwest of Lake Charles, La.

The new facility, considered one of the world's most modern portland cement plants, is Lone Star's 21st and is part of a $75,000,000 expansion program. The company's first plant, in New Orleans, was recently enlarged and now has an annual capacity of 2,200,000 bbl.

The Lake Charles plant was begun in 1955 and has been under construction for 20 months. Precast and prestressed concrete were used in the foundations and principal buildings to sustain the heavy loads and extremes of vibration produced by some of the world's largest moving machinery.

The plant consumes 2,400 tons of raw materials in producing 28,000 sacks of cement per day. Raw materials are obtained from clay excavated by dragline from a 350-acre site 5 miles southwest of Lake Charles, and ground in three mills, each of which uses a load of 208,000 lb. of steel grinding balls.

Two rotary kilns consume a total of 8,500,000 cu. ft. of natural gas every 24 hours. The covered clinker storage has a 90,000-bbl. capacity. Two batteries of 80-ft. high, 25-ft. diameter silos, each with 10 units, have a total capacity of 160,000 bbl.

Additional facilities include docks and rail lines for shipping the cement. The plant is served by the Southern Pacific and Kansas City Southern railroad.

Approximately 150 workers are employed at Lake Charles. R. R. McBride is plant superintendent.

$1,000,000 Crushing Plant Opened by Jeffrey Stone Co.

The Jeffrey Stone Company has completed a $1,000,000 crushing plant located on a strip of land in Little Rock, Ark.

Construction of the plant was begun in March, and limited production was initiated in July. Now in full operation, it has 40 employees. An estimated 25-year supply of quartzitic sandstone is available on the 400 acres of land which the company owns and has under lease.

Seven types of crushed stone are produced, ranging in size from ⅜ of an inch to rip-rap stones weighing a ton apiece. They are concrete aggregate, asphalt aggregate, sealing chips, road stone, filter rock, ballast, and rip-rap, which is used for bank stabilization and on the sides of dams. Approximately 100,000 tons or 2,000 carloads of finished product have been stockpiled. The management plans to begin making specification sand soon.

W. E. Jeffrey is president of the company. Other officers are Ray Tilley, vice-president; Peter Fowler, secretary-treasurer; and Burke M. Toliver, sales manager. Plant manager is Mack Shaver.

Coming Events

January 19-23, 1958 — Chicago. Convention and exposition, National Association of Home Builders. Conrad Hilton and Sherman Hotels and Coliseum.

January 20-23, 1958—Washington, D.C. 13th annual convention, National Agricultural Limestone Institute. Hotel Statler.

January 20-23, 1958—Washington, D.C. 56th national convention, American Road Builders Association. Sheraton Park Hotel.

January 24, 1958—Washington, D.C. Third annual convention, National Crushed Limestone Institute. Hotel Statler.

January 26-30, 1958— Chicago. 39th Annual meeting, Associated Equipment Distributors. Conrad Hilton Hotel.

February 3-6, 1958—Las Vegas, Nev. Third annual convention, National Bituminous Concrete Association. Flamingo Hotel.

February 9-12, 1958 — Washington, D. C. 8th annual convention and show, Mason Contractors Association of America. Sheraton-Park Hotel.

February 10-14, 1958—Chicago. 42nd annual convention and exposition, National Sand and Gravel Association. Conrad Hilton Hotel and Coliseum.

February 10-14, 1958—Chicago. 28th annual convention, National Ready Mixed Concrete Association. Conrad Hilton Hotel and Coliseum.

February 10-13, 1958—Dallas, Texas. Annual meeting, Associated General Contractors of America. Hilton-Statler Hotel.

February 10-14, 1958—St. Louis. Committee Week, American Society for Testing Materials. Hotel Statler.

February 11-12, 1958—Chicago. Annual meeting, National Slag Association. Blackstone Hotel.

February 16-20, 1958—New York. Annual meeting, American Institute of Mining, Metallurgical, and Petroleum Engineers. Statler and Sheraton-McAlpin Hotels.

February 17-19, 1958—Chicago. 41st annual convention, National Crushed Stone Association. Conrad Hilton Hotel.

February 17-20, 1958—Chicago. 38th annual meeting, National Concrete Masonry Association. Sherman Hotel.

February 24-27, 1958—Chicago. Annual meeting, American Concrete Institute. Morrison Hotel.

October, 10-Month Totals Of Construction Contracts Indicate Rising Trend

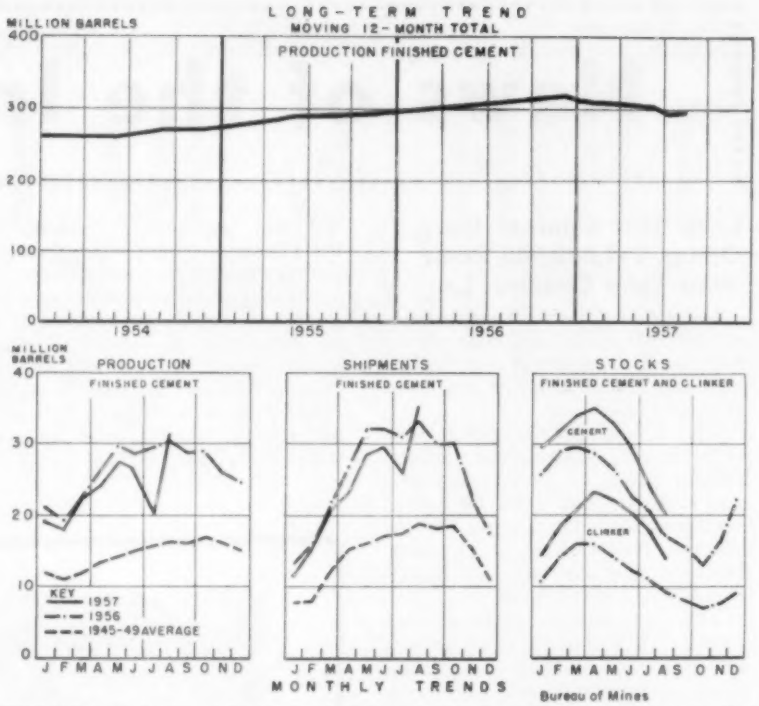
Construction contracts for most major categories rose in October, as compared with the same month of last year, pushing the total contracts to $2,613,791,000, an increase of 7 percent over October, 1956.

The October figures, reported by F. W. Dodge Corporation, show that one of the sharpest rises was in residential building, with the October total of $1,165,380,000 some 11 percent ahead of last year. The number of dwelling units covered by the residential contracts in October was 89,375, up 7 percent from October, 1956. The dwelling unit rise, the Dodge figures indicated, was accounted for entirely by apartment buildings and two-family houses, with one-family units down 1 percent.

October non-residential building contracts, at $910,219,000, were 5 percent ahead of the same month of last year, with commercial, industrial, and educational buildings, contributing to the rise.

Heavy engineering contracts in October totalled $538,192,000, an increase of 2 percent over October, 1956. This 2 percent increase was the net result of a very large increase in public utility contracts being substantially offset by a 25 percent decline in public works contracts.

Cumulative figures for contracts in the first 10 months of 1957, with the percentage change from the same period of 1956, are: total construction at $27,840,371,000, up 2 percent; residential at $11,370,438,000, up 1 percent; non-residential at $9,715,753,000, up 2 percent; and heavy engineering at $6,754,180,000, up 5 percent.



SUMMARY—Production of finished portland cement in August, 1957, as reported to the U. S. Bureau of Mines totaled 31,406,000 bbl., an increase of 4 percent over August, 1956. Mill shipments in August, 1957, totaled 35,365,000 bbl., an increase of 6 percent compared with August 1956. Stocks of 20,019,000 bbl. of finished portland cement on hand August 31, 1957, were 17 percent more than those on hand August 31, 1956. Clinker production during August, 1957, totaled 27,395,000 bbl., a decrease of 3 percent from the August, 1956, figure.

PRODUCTION—One hundred and sixty-one (161) plants in 37 states and Puerto Rico reported a production of 31,406,000 bbl. of finished portland cement during August, 1957, compared with 30,055,000 bbl. in August, 1956.

Clinker production during the month of August, 1957, was 27,395,000 bbl. compared with 28,334,000 bbl. during the same month last year.

High-early-strength portland cement production in August, 1957, of 804,000 bbl. increased 3 percent over the August, 1956, production.

Production of prepared masonry cement was 1,609,000 bbl. during August, 1957, an increase of 18 percent over the August, 1956, figure.

SHIPMENTS—Mill shipments of finished portland cement for August, 1957, totaled 33,365,000 bbl. compared to 33,324,000 bbl. in August, 1956.

In August, 1957, shipments were higher in fifteen (15) districts and lower in eight (8) districts than in August, 1956. The greatest increases were in the Virginia-South Carolina and Puerto Rico districts. The greatest decreases were in the Georgia-Florida and Wyoming-Montana-Idaho districts.

Mill shipments of high-early-strength portland cement totaled 1,233,000 bbl. in August, 1957, a 13 percent increase over the 1,082,000 bbl. shipped in August, 1956. No shipments were made from mills in Puerto Rico.

Mill shipments of prepared masonry cement in August, 1957, totaled 1,658,000 bbl., an increase of 9 percent over the 1,524,000 bbl. shipped in August, 1956. Two-thirds of these shipments were from mills in the northern states east of the Mississippi River. Prepared masonry cements are shown in 376-pound barrels although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 20,019,000 bbl. of finished portland cement were on hand August 31, 1957, an increase of 17 percent over the 17,068,000 bbl. on hand August 31, 1956. Stocks of clinker increased 47 percent from 9,264,000 bbl. on August 31, 1956, to 13,622,000 bbl. on August 31, 1957.

FIRST EIGHT MONTHS—For the January-August period this year, the volume of production of finished cement amounted to 189,396 tons, compared with 208,458 tons in the same period of 1956. Total shipments for the first eight months of 1957 are reported as 190,089 tons; in 1956 (January-August period) the total shipments were 206,951.

Two New District Engineers Named by Asphalt Institute

The Asphalt Institute announces the appointment of two new district engineers.

Lt. Col. Wesley D. Alcorn, formerly with the U. S. Army Engineering school at Ft. Belvoir, Va., was named district engineer for Chicago, Ill., and Carl S. Larson, formerly with the California Division of Highways, has been chosen engineer for Portland, Oreg.

William E. Hole Jr. Elected President Ohio S. & G. Assn.

William E. Hole Jr., vice-president of the American Aggregates Corporation, Greenville, Ohio, was elected president of the Ohio Sand and Gravel Association at its annual meeting in Columbus, Ohio. He succeeds J. E. Martin of the Enon Sand and Gravel Company, Enon, Ohio.

Other officers of the association are W. E. Pohlman, American Aggregates Corporation, Columbus, treasurer, and Claude L. Clark, Columbus, executive secretary (re-elected).

The Geelong plant of the Australian Portland Cement Pty. is undergoing expansion which will raise the capacity to 450,000 tons annually. Another Australian cement operation —that of Kandos Cement, Ltd.—has a plant on order which will increase capacity there to approximately 200,000 tons per year.

3-Way Merger Approved By Shareholder Majority—New Firm Name Chosen

Shareowners of Riverside Cement Company, Peerless Cement Corporation, and Hercules Cement Corporation recently voted in favor of an agreement and joint plan which provides for the merger of Peerless and Hercules Cement Corporations with and into Riverside Cement Company. The name of the new company will be the American Cement Corporation upon the effective date of the merger.

Affirmative votes were by majorities well in excess of those required by law. The combined vote of the shareowners of the three corporations resulted in approval of the merger by 98.9 percent of the shares voted, or by 88.4 percent of all outstanding shares.

Penn-Dixie Plant Closed—No Storage Space Available

A seven-week shut-down began at the Penn-Dixie Cement Corporation's plant in West Des Moines, Iowa, on December 15, reportedly because increased production had filled storage facilities.

According to R. A. Bechtold, plant manager, the firm's recent $4,500,000 expansion program increased production capacity to more than 6,500 bbl. a day.

The West Des Moines facility was closed for over two months last summer because of a strike.

Arizona's Natural Resources Summarized in New Bulletin

An up-to-date summary of natural resources in Arizona is presented in a bulletin being distributed by the ARC Laboratories, Phoenix, Ariz.

This bulletin, called *Arizona's Natural Resources*, may be obtained free of charge from the laboratory or from the publishing agency, the Arizona Development Board, 1521 W. Jefferson St., Phoenix.

Cement production in Italy at the end of 1956 reached 11,310,000 metric tons, an increase of 170 percent in comparison with the prewar (1937) figure.

Jefferson Lake Sulphur Company's (New Orleans, La.) Peace River sulphur reduction plant in British Columbia, Canada, has been completed and has begun operations.

Continued Rising Trend Seen In Open-Market Lime Sales

Domestic sales of open-market lime in August (858,602 short tons) increased over the previous month's output, according to reports made by producers to the U. S. Bureau of Mines. Increases were noted in all major categories.

The accompanying table shows sales by types and major uses.

Lime Sold by Producers[1] in the United States, in Specified Periods of 1956-57, by Types and Major Uses, in Short Tons.

	1957 July	1957 August	1956 August	1957 January-August	1956 January-August
By types:					
Quicklime	590,646	680,379	605,482	4,875,564	4,671,750
Hydrated lime	162,817	178,223	173,789	1,256,718	1,302,841
Total lime[2]	753,463	858,602	779,271	6,132,282	5,974,591
By uses:					
Agricultural:					
Quicklime	8,256	9,701	7,837	46,250	66,494
Hydrated lime	8,005	9,630	10,106	105,577	109,665
Total	16,261	19,331	17,943	151,827	176,159
Building:					
Quicklime	18,111	13,950	14,760	127,860	109,423
Hydrated lime	83,681	92,872	97,237	612,170	674,585
Total	101,792	106,822	111,997	740,030	784,008
Chemical and other industrial:					
Quicklime	375,527	404,082	394,560	3,084,347	3,036,725
Hydrated lime	71,131	75,721	66,446	538,971	518,591
Total	446,658	479,803	461,006	3,623,318	3,555,316
Refractory (dead-burned dolomite)	118,752	252,646	188,325	1,617,107	1,459,108

[1] Also includes a small quantity of captive tonnage. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

[2] Approximately 60 percent of lime produced is high-calcium and 40 percent high-magnesium.

Because these rugged Back-Rippers break up the ground while the tractor is backing up — thus permitting the blade to make a **full** load **faster** on the forward trip — they give you **double advantage.**

Preco Back-Rippers make **every** dozing job easier — they pull out rocks and roots. Steep banks can be raked down quickly and road building is speeded up as the Rippers tear out boulders, ledge rock and hard material.

FOR . . . Building Pioneer Roads
Clearing Land and Rights-of-way
Gravel Pit Operations
Slate Breaking in Strip Mines
Logging
Mounted on Pusher Tractor for Faster Scraper Loading.

BACK UP RIPPING **EASIER FORWARD DOZING**

Preco Back-Rippers are completely automatic in operation — they dig in on the back-up trip and ride on the surface when going forward. There are no controls and, when desired, they can be locked up out of the way.

See your Caterpillar Dealer or send the coupon for information.

PRECO INCORPORATED
6300 E. Slauson Avenue
Los Angeles 22, Calif.

Please send information on Preco Back-Rippers.

Name_____

Address_____

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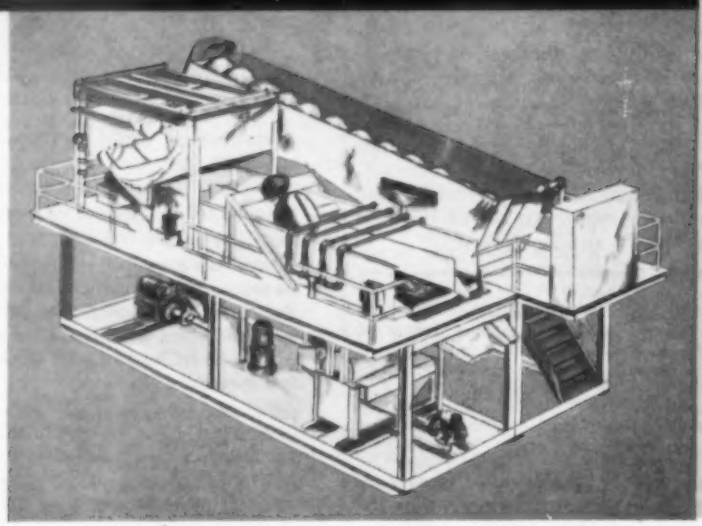
You can't beat

and EAGLE IRON WORKS

has the *experience* . . .



This *NEW* EAGLE AGGREGATE PROCESSING EQUIPMENT

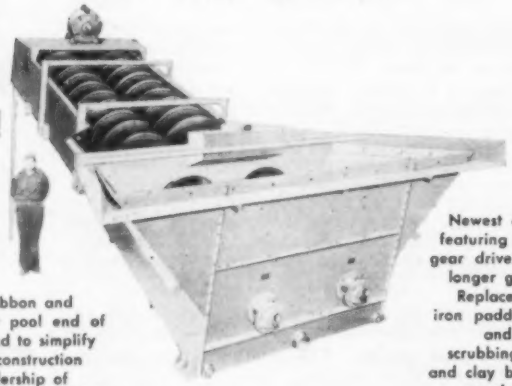
WILL ENABLE YOU TO MEET SPECIFICATIONS . . . INCREASE YOUR PROFITS!

↑ Eagle heavy media separation plant

An efficient unit for sand and gravel or crushed stone producers with separation problems that can not be solved by the usual methods. Pre-assembled at factory into four easily connected units. Quickly set up. Transportable in four block sections. Employs screw densifier of Eagle design and use of other proven auxiliary equipment. Requires no below-ground concrete sump. Assures best separation through most productive pool area provided by OCC Separatory vessel.

Eagle screw washers → with new features!

Eagle Single Screw and Double Screw Fine Material Washer-Classifier-Dehydrators always outstanding for performance now feature Improved gear drive, Velocity-killing feed box that reduces turbulence by introducing fine material at critical point in a flat ribbon and Removable, gasketed side flares at pool end of tub which can be removed for travel and to simplify installation. *Plus* all the design and construction features that have maintained the leadership of both Eagle Fine Material and Coarse Material Screws for so many years.



Eagle log washer with compound drive →

Newest and most productive log washer, featuring positive, power-conserving, compound gear drive. No stalling under heaviest loads, longer gear life. Non-deflecting tubular shaft. Replaceable Ni-Hard nickel-chromium alloy iron paddle shoes. Gravel, crushed stone and ore get a thorough abrading and scrubbing to break up and wash out soft stone and clay balls. Also breaks down cemented conglomerates or gooey material.

Enter 26 on card, page 167

experience !

86 years of it

Eagle pioneered the design and construction of screw washer-classifiers-dehydrators, early recognizing the need for separate units of different design to handle fine materials and coarse materials. *Experience* through the years dictated improvements until the present modern design was achieved. There is no finer, more efficient washer built.

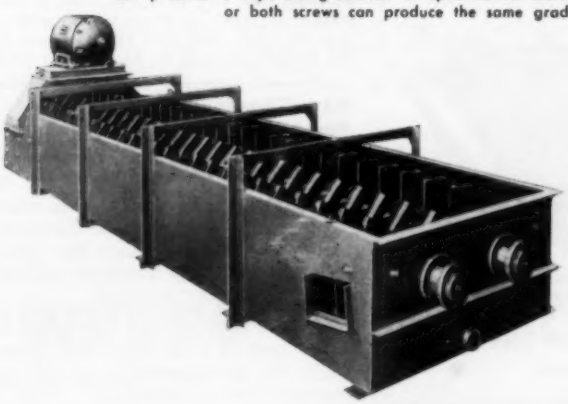
In recent years Eagle pioneered the water scalping-classifying tank to further enable producers to meet specifications. Here again, *experience* has given the industry outstanding design.

Eagle builds the most complete line . . . Eagle has a well qualified sales and service organization . . . large engineering staff, pilot aggregate plant and testing laboratory to help solve your problems . . . 46% of Eagle Equipment sales are repeat sales . . . you can bank on Eagle experience.

Visit the "eye-opening" EAGLE EXHIBIT at the NSGA Convention, Chicago Coliseum, February 10-13. See an actual full scale, Portable Washing-Classifying-Dehydrating Section, as illustrated at the left!

↑ Eagle portable washing-classifying-dehydrating section

Another Eagle "first". Provides mobility from pit site to pit site. A complete fine material washing-classifying-dehydrating unit with standard water scalping-classifying tank equipped with automatic bleeder valves, metering "splitter" gates and three cell collecting-blending flume mounted above two single screw washer-classifier-dehydrators. Each screw can produce a separate gradation of specification material or both screws can produce the same gradation.



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EAGLE IRON WORKS

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FACTORY-TRAINED DISTRIBUTORS THROUGHOUT THE U.S. AND CANADA

SINCE 1872

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EAGLE IRON WORKS

M. F. Goudge Awarded Univ. of Toronto Prize For Recovery Process

M. F. Goudge, chief of the Industrial Minerals Division of the Department of Mines and Technical Surveys, Ottawa, has been awarded the McCharles Prize by the University of Toronto for developing a new process of producing magnesia from Canadian raw materials.

The McCharles Prize, which consists of a medal and a $1,000 grant, was presented to Mr. Goudge at the recent annual dinner held in Toronto by the Canadian Institute of Mining and Metallurgy's Toronto branch.

The honor has been awarded from time to time for the invention or discovery of any new and improved process for the treatment of Canadian ores and minerals after such process has been proved to possess special merit on a practical scale. Mr. Goudge's recovery process has formed the basis of a thriving industry near Wakefield, Quebec.

This is the third important honor to come to Mr. Goudge for research achievements. In 1942 he received the Gold Medal of the Professional Institute of the Public Service, and in 1953 he was awarded the Blaylock Medal by the C.I.M.M. for distinguished service to Canada in the field of industrial minerals.

The Torrance Sand and Gravel Company of Torrance, Calif., plans to build a new plant to be known as the Corona Sand and Gravel Company in Corona, Calif.

A modern cement plant has begun producing 60,000 tons of cement in Las Palmas, Spain. Capacity output is 120,000 tons. A quay large enough to dock ships of 1,000-ton capacity has been built alongside the plant.

M. F. Goudge

Science-Technology Index To List Pit and Quarry

Beginning with the January, 1958, issue PIT AND QUARRY will be indexed in the *Applied Science & Technology Index*, formerly known as the *Industrial Arts Index*. This index covers the leading periodicals in the fields of engineering, science, geology, manufacturing, etc. All articles appearing in these publications which are judged to be of permanent interest and value are indexed under appropriate subjects. The Index is published monthly, with cumulative issues at intervals through the year and a final cumulation at the end of each year.

The *Applied Science & Technology Index* is subscribed to by business firms which need quick access to current information on any subject in the field it covers. It is also found in all important libraries—public or private—in universities, engineering schools, etc.

N.A.L.I. Report for 1956 Shows Increased Use of Agricultural Limestone

A survey which was completed recently by the National Agricultural Limestone Institute shows that the use of agricultural limestone on our nation's farms increased in 1956. The 22,021,393 tons applied to the soil in 1956 is almost 1,500,000 tons more than the amount used in 1955.

The best year for lime usage was 1947, when over 30,000,000 tons were applied. From then until 1954 the trend was downwards when only 18,974,945 tons were used, the lowest for any year since 1941. These tonnages are only about one-fourth of the 80,000,000 tons of lime recommended by soil authorities as an annual application.

In 1954, almost all states required soil tests as a prerequisite to payment. Since then 24 states eliminated that requirement and for the 1958 program some of the restrictions which would have limited lime usage have been relaxed.

• Wilson Perkins Foss Jr., 66 chairman of the board of the New York Trap Rock Corporation, New York, N. Y., who died on November 17, 1957, at Memorial Hospital in New York City. Mr. Foss had continued in the business founded by his father in 1919.

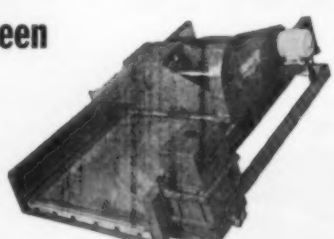
Dow Chemical Company Purchases Magnesium Plant

After having operated the government-owned magnesium plant at Velasco, Tex., on a lease basis since World War II, the Dow Chemical Company has purchased the plant from the General Services Administration for $20,700,000.

This facility includes a rotary kiln plant used to make lime from oyster shells for the magnesium production process.

The Most Efficient Screen You Can Buy

For difficult, fine mesh screening, the Leahy® Vibrating Screen is a real buy. Not only does it impart a mesh clearing Differential Vibration to the jacket, but it is built to accommodate fully integrated FlexElex® heating that keeps the mesh dry and wide open. The original cost is low and maintenance is negligible. Send for Bulletin 16-EH.



Made by the Original Deister Company Established 1906

THE DEISTER CONCENTRATOR COMPANY
911 Glasgow Avenue, Fort Wayne, Indiana

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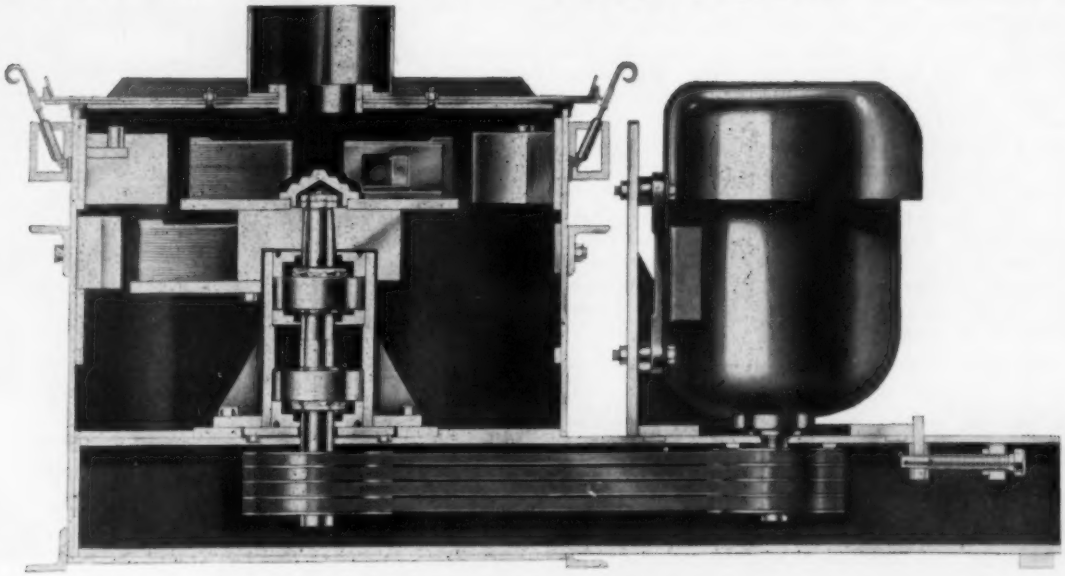
for fine, uniform aggregate



3-Foot Tornado Impact Crusher—Single Stage on Right—Double Stage on Left.

TORNADO IMPACT CRUSHER

COMPLETE FRAGMENTATION WITH AND ACROSS THE GRAIN

- **Reasonably priced. Lowest cost per ton of cubical aggregate produced.**
- **Light in weight. Completely self-contained. Low head room. Easy to install.**
- **Lowest power consumption. Produces up to 70 tons per hour using only 40 HP in 4½ foot crusher or 30 to 50 tons per hour in 3 foot crusher.**
- **Less down time. Wearing parts hook in for easy replacement.**
- **V-belt drive. Vertical shaft from 1800 RPM motor.**

The exclusive "square" impact operation gives you fine uniform aggregate. Stone particles smash with crushing blows against the breaker plates with such terrific impact that fragmentation takes place with the grain as well as across the grain.

Tornado can be powered to suit the capacity desired. Has a 12½ inch, 7 inch or 5 inch circular feed pipe operating from 1200 to 1800 RPM. The 12½ inch opening will take 4 inch feed, the 7 inch takes 2 inch feed, and the 5 inch handles 1½ inch feed. Impact velocities range from plus or minus 12,000 feet per minute. It is particularly adapted to recrush previously sized material. Can also be adapted for crushing tailings from stone, gravel or slag ranging from 4 inches down.

For free demonstration simply send us a sample of your material. We will furnish you, without charge or obligation, with an example of what the Tornado Impact Crusher can do for you. Save money—do a better crushing job with a Tornado.

WERCO STEEL CO.

2151 E. 83rd STREET, CHICAGO 17, ILLINOIS
PHONE: ESSEX 5-8446

Enter 29 on card, page 167

Arizona Portland Cement Building $12,000,000 Plant With 2,000,000-Bbl. Output

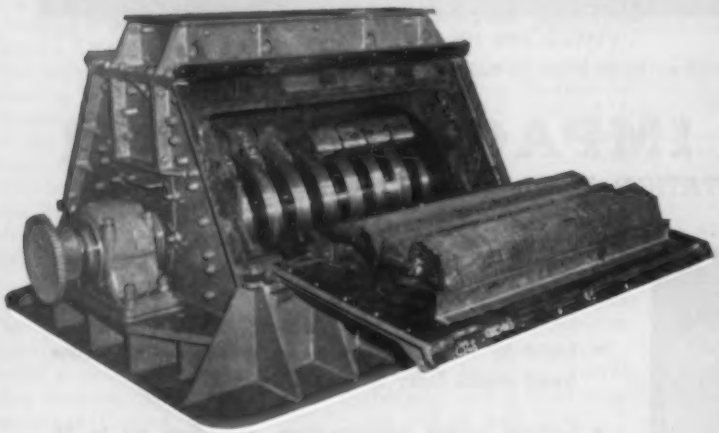
A $12,000,000 cement plant with an annual capacity in excess of 2,000,000 bbl. will be built at Ash Fork, Ariz., in 1958 by the Arizona Portland Cement Company, a wholly-owned subsidiary of the California Portland Cement Company.

The dry process, two-kiln plant will be constructed on leased land containing large deposits of high-quality limestone and other needed raw materials. Preliminary work has already begun, and the plant is scheduled to be completed and in operation by the spring of 1959. Plans are being prepared by the Donald R. Warren Engineering Company, Los Angeles, Calif., specialists in such design.

The Ash Fork facility will bring the California Portland Cement Company's annual capacity to 14,375,000 bbl.

The Casey Stone Company, Liberty, Ky., has installed a $20,000 Universal Engineering Co. hammermill with an hourly capacity of 50 tons and a daily capacity of approximately 400 tons to crush agricultural limestone.

EASY TO "GET AT"



In a few minutes the top covers on either side of the Pennsylvania Reversible Impactor can be unfastened and swung back on hinges, exposing breaker blocks and liners, and making hammers and rotor assembly handily accessible for inspection, adjustment or repairs. Thus time for maintenance is held way down.

Since the rotor direction is reversible to run clockwise or counter clockwise, hammer turning is eliminated. Patented Adjustable Breaker Blocks enable you to get much longer wear from hammers and blocks, with no variation in hourly tonnage or uniformity of product. To get complete information on the crusher that is preferred by the cement industry two to one over all others for secondary crushing, ask for bulletin 6018.

Pennsylvania Crusher Division
Bath Iron Works Corporation
West Chester, Penna.

PENNSYLVANIA REVERSIBLE IMPACTORS

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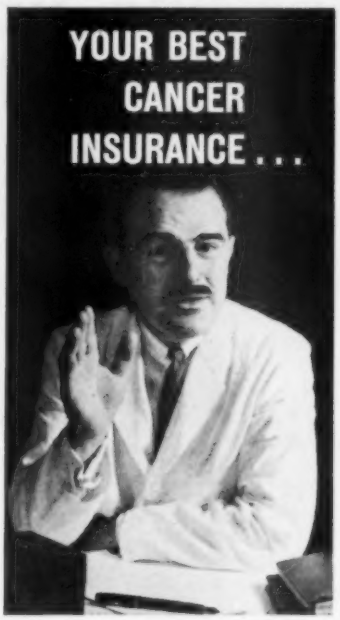
YOUR BEST CANCER INSURANCE . . .



a health checkup
once a year
every year . . .
make it a habit
. . . for life.

American Cancer Society

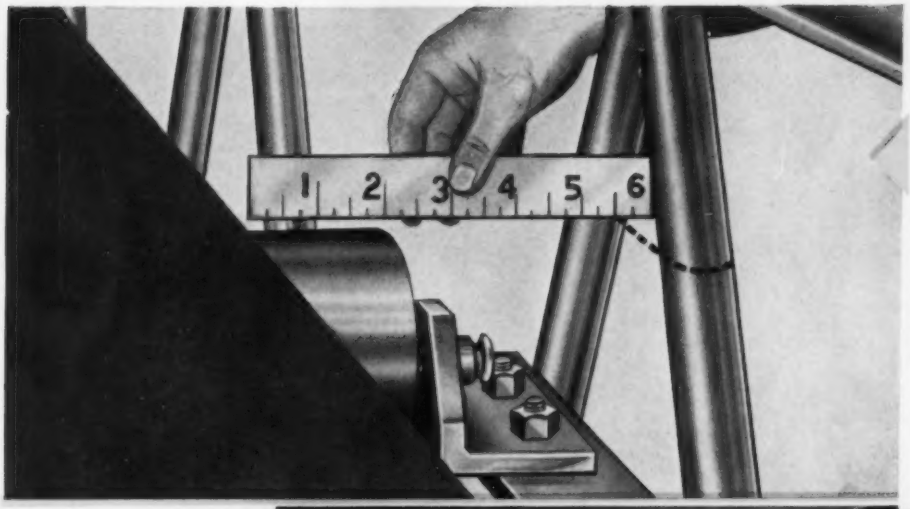
Columbia-Southern Chemical Plans $8,000,000 Cement Mill

Columbia-Southern Chemical Corporation, Pittsburgh, Pa, plans to build a cement plant costing between $7,000,000 and $8,000,000 near the company's limestone mine at Barberton, Ohio.

Grading and foundation work has already begun. Plant design will be modeled after the Marquette Cement Company's Milwaukee (Wis.) plant, which is 400 ft. long, 60 ft. wide, and has 16 storage silos.

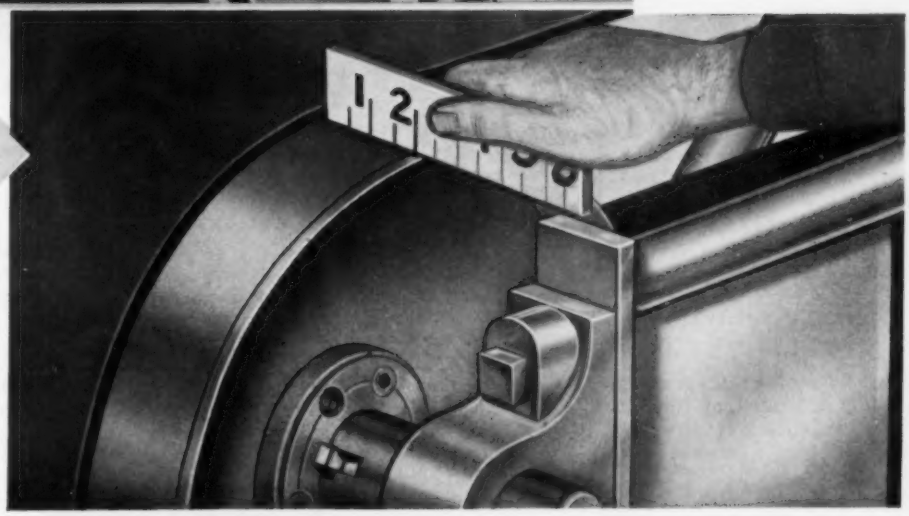
Initial output will be 4,000 bags of cement a day. Facilities to expand the operation to 8,000 bags a day will be incorporated. The plant will employ more than 100 persons.

Development of a recently discovered 2,000-sq. mile bauxite deposit on the west coast of Cape York Peninsula in Queensland, Australia, may result in a new deep-water port at Weipa and a community of at least 6,000 persons. The deposit is said to be the largest known payable occurrence of bauxite in the world. The area is at present virtually uninhabited, except for some aborigines.



WIDER FRAME...
MARCO Tubular Frames are widest in the industry. They provide 100% more space (5½") in the critical area... between belt edge and nearest frame member. Pedestal type return idler brackets are used, instead of hanger brackets that confine and damage belt.

WIDER FACE PULLEYS...
MARCO is first with modern pulley specifications. 2" between belt and pulley edge...provides 100% greater protection than outmoded standards. Reduces possibility of belt destruction caused by "belt wandering" in high tension areas.



WHY RISK COSTLY, CONVEYOR BELT DAMAGE?

Only wider, MARCO Tubular Frame Conveyors provide maximum 'belt-edge' protection

Repairing or replacing conveyor belt represents the largest maintenance expense in a conveyor installation. To prolong belt life, MARCO conveyors are first to have all these belt-protecting features.

Wider Frame: Completely outmodes other conveyors that narrowly confine and damage belt should severe 'belt-wandering' occur.

Wider Face Pulleys: MARCO'S wider frame permits the use of modern, wider face pulleys to further protect belt from damage should 'belt-wandering' occur.

All Tubular Members: MARCO Tubular Frames are more rigid. Constructed of the strongest known structural member, these frames are modern ...and resist material and water build-up. Sharp 'belt-cutting' edges are eliminated with this exclusive construction.

Rigid Joint Construction: Another MARCO exclusive...4 bolts in each connection...16 in each joint. Not the usual 1 or 2 per connection. Joints are more rigid. Resists frame misalignment, simplifying belt training and increasing belt life.

If wind, uneven loading or other factors should cause 'belt-wandering'... with a MARCO frame you have the most complete protection possible against costly 'belt-edge' damage. This greater protection is yours at no greater cost.

MARCO'S Quality and Exclusive Features Mean More for Your Conveyor Dollar...

Remember, your conveyors are not mere plant accessories... they deserve the attention of a specialized manufacturer offering modern specifications, carefully and properly designed to meet your most exacting requirements. It will pay you to check MARCO quality, exclusive features and proven performance record before you buy.

For more information see your Marco distributor or contact E. F. Marsh Engineering Co., St. Louis 10, Mo.

MARCO*

*Trademark Reg.

engineered MARCO products:

Tubular Frame Belt Conveyors • Conveyor Idlers • Solid and Self Cleaning Steel Pulleys
Bucket Elevators • Control Gates • Feeders • Bins

Engineering Societies To Have $10,000,000 Center In United Nations Plaza

Plans have been announced for a new $10,000,000 United Engineering Center to be erected on United Nations Plaza between 47th and 48th Street, New York, N. Y. The new building will replace the present Engineering Societies Building at 29 W. 39th St., which is now inadequate as a result of the tremendous growth of technology since the building was first occupied 50 years ago.

The new center will serve as the headquarters of 16 national engineering societies, having a total membership of about 250,000 engineers.

Present plans call for the occupancy of the building in the fall of 1960. It will be a 20-story tower surrounded by lower structures with landscaped grounds. In addition to adequate facilities for present functions, the Center will have provisions for the continuing growth of the engineering profession.

Founder societies which will have headquarters in the new building are the following: American Society of Civil Engineers, American Institute of Mining, Metallurgical and Petroleum Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, and American Institute of Chemical Engineers. Eleven associated societies will also have headquarters in new building.

Sketch of proposed $10,000,000 United Engineering Center, to be erected on United Nations Plaza in New York, which will serve as the headquarters of 16 national enigneering societies.

Suit vs. Wisconsin Quarry Decided in Company's Favor

In Milwaukee, Wis., a decision in the circuit court granting the Wauwatosa Stone Company access to its quarry was upheld recently by the State Supreme Court.

Area residents had complained of the nuisance caused by trucks and blasting operations, and Milwaukee and Wauwatosa had appealed the first court's decision. Chief Justice Martin pointed out that since the quarry had been operated since 1910, before the development of a residential area around it, residents should have "anticipated the annoyances of which they now complain."

Four New Members Elected To P.C.A. Board of Directors

The Portland Cement Association announced the election of four new members to its board of directors at its annual meeting in Chicago, Ill.

The four are Eugene D. Hill, president, Louisville Cement Company, Louisville, Ky.; C. T. Fuller, vice-president, Allentown Portland Cement Company, Allentown, Pa.; B. B. Pelly, vice-president, Olympic Portland Cement Company, Ltd., Seattle, Wash.; and L. T. Welshans, general manager of the Cement and Coke Division, Standard Portland Cement Division, Diamond Alkali Co., Cleveland, Ohio.

George E. Warren, president of Southwestern Portland Cement Company, Los Angeles, Calif., will continue as chairman of the board of directors.

Retiring directors are: Ben W. Calvin, president, Aetna Portland Cement Company, Bay City, Mich.; D. A. Symmes, president, Glens Falls Portland Cement Company, Glens Falls, N. Y.; and C. F. Lewis, president and manager, Volunteer Portland Cement Company, Knoxville, Tenn.

• The Dawes Silica Mining Company, Inc., Thomasville, Ga., uses an S-A Swivelpiler, manufactured by Stephens-Adamson Mfg. Co., Aurora, Ill., in an unusual setup. Highly abrasive silica sand would have to be handled at least once, possibly twice, by a locomotive crane with a rehandling bucket, to get the desired piling location. To eliminate this double handling, an S-A Swivelpiler was installed. This unit handles 140 t.p.h. of raw material, which it can throw as far as 50 ft. in any desired direction.

Two Cement Plants to Open In Colombia Early in 1958

Two new cement plants valued at a total of $6,000,000 will go into production this year in Colombia.

Cementos Boyaca will produce 800 to 1,000 tons of slag cement daily, using blast furnace slag from the nearby Paz del Rio steel plant. About 55 percent of the capital of this plant is American. Cementos Caldas in Neira is expected to turn out 3,500 tons daily.

Present Colombian cement output is approximately 3,500 tons a day. The new plants will raise this figure by about 35 percent.

since 1919 "Tool Steel Process" hardened products have established satisfactory service records in plants of the Lone Star Cement Corporation. They have effected savings in maintenance, replacement and downtime costs.

Lone Star uses many TSP Hardened Products including pins, bushings, herringbone ring gears, sheaves, bevels for kilns, screw conveyor gudgeons and bearings, shafts, track wheels, screw conveyor drive gearing, crane and general gearing, herringbone shaft pinions, brake wheels; ball, rod and masonry mill pinions.

TSP shines at LONE STAR

TSP products are hardened by our special process. The file hard surface to full depth of permissible wear gives maximum life. The core refined for toughness and ductility gives a maximum strength. Each TSP product carries a written guarantee that it will give a longer life in the same service than any other product.

THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI 16, OHIO, U.S.A.

AGMA

The Standard of Quality Since 1909
for Gears • Pinions • Rolls • Wheels and Other Hardened Products

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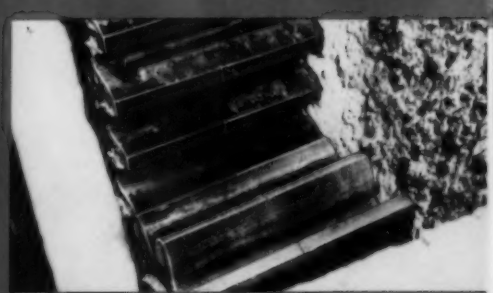
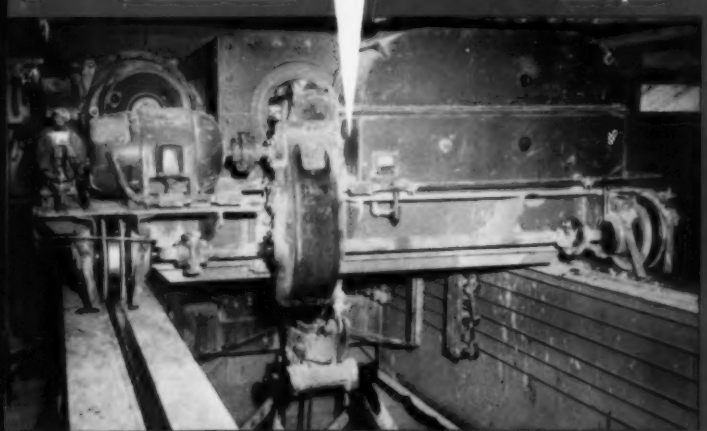
AD 1022-A

TSP Sheaves on overhead cranes

TSP Gudgeons and Bearings on screw conveyors



Close-up of masonry mill drive pinion and bull gear



TSP Wheels and Gearing on 3 yd. bucket cranes

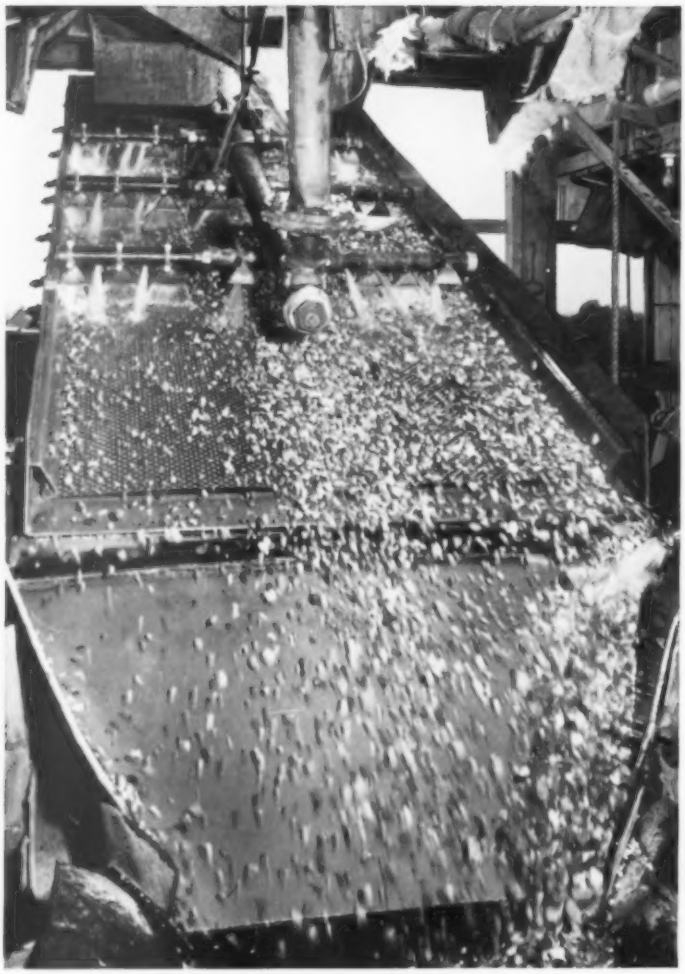
TSP Drive Pinions on rod, ball and masonry mills

Want high-speed separation? Low-cost operation?

Size it with CA

Concentric Action

Vibrating Screens



IDEAL SIZING-WASHING COMBINATION. This sand and gravel plant uses Link-Belt non-clogging spray nozzles in combination with a triple-deck "CA" screen. Fast tumbling action exposes every particle for uniform rinsing.

Lively LINK-BELT screen stratifies beds fast—gives every particle maximum sizing opportunity

In the powerful Link-Belt vibrator shown above, you see the key to the fast, accurate, unfailing separation delivered by Link-Belt "Concentric Action" vibrating screens. Mounted in a unitized, extremely rigid deck assembly, this two-bearing vibrator is completely enclosed . . . incorporates unbalanced weights that are adjustable to the amplitude offering best balanced of speed and effectiveness. Frictionless labyrinth seals lock out dirt and abrasive dust from the vibrator housing . . . save maintenance troubles.

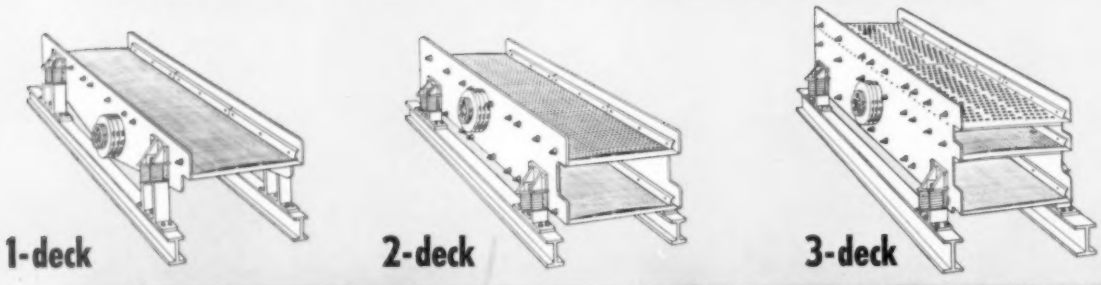
Designed specifically for medium- to heavy-duty screening needs, Link-Belt "CA" screens are fully described in Book 2554. Your Link-Belt office can furnish a copy, or write direct if you prefer.

LINK-BELT

VIBRATING SCREENS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.538

Choice of screen decks permits up to 3 simultaneous separations



See our exhibit — Sand & Gravel, Ready-Mix Concrete Show — Chicago — February 10-13

Enter 34 on card, page 167

Carl Kreager, production superintendent; G. R. Grimsley, special assistant to the general manager; and August Meinrath, plant superintendent—all recently promoted to these Columbia Cement positions.

Columbia Cement Promotions Announced for 3 on Staff

Three top management promotions have been announced by the Columbia Cement Division of Columbia-Southern Chemical Corp.

G. Reed Grimsley, plant superintendent, has been appointed to the newly-created position of special assistant to the general manager. Mr. Grimsley joined Columbia Cement as a chemist in 1924. Previously he had been chief chemist for the Superior Cement Company. He was promoted to chief chemist in 1926, to assistant superintendent in 1931, and to superintendent in 1943.

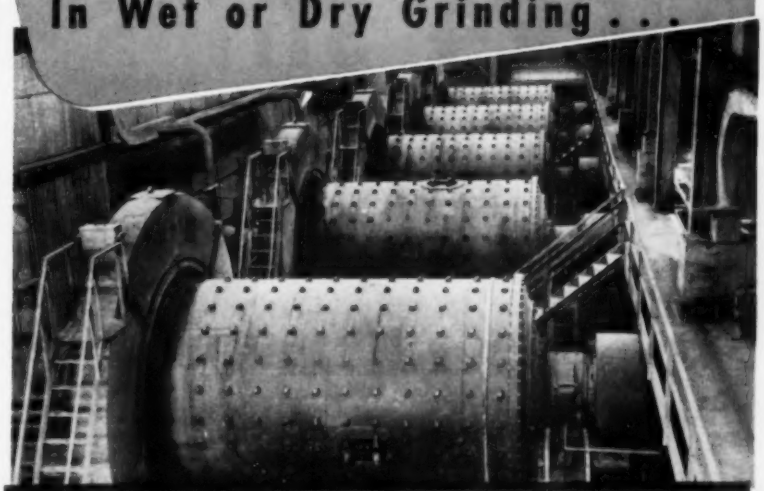
He has been active in the work of the Portland Cement Association, having served on the Accident Prevention and Technical Committees for many years.

Carl Kreager has been promoted to production superintendent. In his new post Mr. Kreager will be responsible for the mine, quarry, railroad, mill, shipping, powerhouse and laboratory departments. He started with Columbia Cement in 1925 as a chemist. He was promoted to research and development engineer in 1948, and to assistant to the superintendent in 1955.

August Meinrath has been appointed to the position of plant superintendent. He will be responsible for plant production, engineering, maintenance, purchasing, storeroom and research and development. Since 1955 Mr. Meinrath has been project engineer in charge of the plant expansion program at Columbia Cement.

Fire recently destroyed a sand-washing shed of the Grove City Sand & Gravel Company, Slippery Rock, Pa., causing a loss estimated at $20,000.

In Wet or Dry Grinding . . .



Calumet Ni-Hard* Grinding Balls

Save and Save and Save!

If you are dry grinding, you'll find that Ni-Hard grinding balls last from five to eight times longer than do alloy steel balls.

And in wet grinding, a recent test shows that .53 pounds of alloy steel balls were used per ton of ore ground. Under the same conditions but .30 pounds of Ni-Hard grinding balls were used.

The reason, of course, lies in the inherent hardness and long life of the Ni-Hard alloy plus the combination of modern equipment and close quality control. In the case of quality control, balls are heat treated in furnaces equipped with instruments which automatically note the time and temperature of each load. From this information, quality control can determine that each lot of balls receives the correct heat treatment to reduce the retained austenite to the proper level.

Balls are available from stock in the following sizes: 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2", and 2". Write for more information.

*Reg. U.S. Pat. Off., Intl. Nickel Co., Inc.

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Enter 35 on card, page 167

TD-24 "strips" at lowest of any crawler on the

reports Morris Enterprises, Owensboro, Kentucky

Upgrade, downgrade, or on the level, famous Planet Power steering gives you positive and constant load control on turn or straightaway. And this planetary system that gives full-time "live" power on both tracks lets the TD-24 pull the same big loads on turns as on straightaways! Morris Enterprises owns this TD-24 that's stripping overburden near Knottsville, Ky.

Benching or 'dozing around curves is a cinch for the TD-24. TD-24 two-track turning power never backs off from the load—and does not let the load "fish-tail" the tractor or slip the tracks! Instead you "feed" power to both tracks to keep the full productive push where you want it!

cost per cu yd market...

On this stripping operation near Knottsville, Kentucky, Morris Enterprises are moving a maximum of 45 feet of overburden—to uncover a 42-inch coal seam. Overburden is a 5 to 10-foot earth layer; the balance, shale and soapstone.

An International TD-24 dozer is moving 50% of the overburden on a 60 to 70-foot wide cut ahead of shovel operation. A 3½-cu. yd. shovel moves the other 50%.

"This kind of performance sold me"

"Have been using International TD-24's since 1950," reports P. H. Morris, for Morris Enterprises. "The TD-24 has proven able to move dirt cheaper per cu. yd. than any other track-type tractor. Upkeep has been low and TD-24 ease of operation enables the operator to maintain full production—after hours of continuous dozing.

"Live power on both tracks while turning is a definite advantage for full load maneuverability. And shifting on-the-go speeds up the production.

"One of the TD-24's ran 7,500 hours before major overhaul on rails, shoes, and engine. Still in use with original rollers and sprockets.

"This kind of performance sold me on TD-24's for my operation."

See how you 'doze bonus yardage on the turns—stay "on course" with offset loads—keep positive load control, upgrade or down, with TD-24 Planet Power steering to eliminate "dead-track drag." Prove the cycle-speeding advantages of exclusive Hi-Lo shifting—for adjusting the speed to the load—for gaining capacity-adding reverse speed on shuttle dozing. Compare International's Cerametallic-faced engine clutch—for power-transfer efficiency—operating and servicing ease—long life! See your International Construction Equipment Distributor for a TD-24 demonstration!

International® Construction Equipment

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

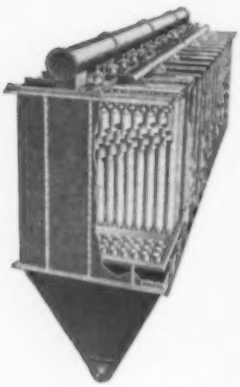
Enter 37 on card, page 167

Norblo solves dust problems

Whatever you need in dust or fume control, be sure to check *Norblo*

In Bag Type, Centrifugal or Hydraulic dust collecting systems, Norblo Dust and Fume collection equipment has many design advantages. These three types, frequently used in certain combinations, provide economical dependable control as required in smelting, rock products, chemical, milling and processing fields.

What is the best approach to your dust problems? Norblo helps you select—applies engineering skill and "know how" gained in first hand experience of over 40 years in many industries.



Norblo Bag Type Systems

Automatic and Standard

For continuous or heavy duty service providing very high efficiency at very low cost of operation and maintenance. Basic unit contains 78 bags, 6" diameter, 8' 3" long. Air flow is upward, from inside, thus keeping bags fully distended. Total free cloth area per compartment 936 square feet. Shaking and cleaning controlled by electric timer, is cyclic, one compartment at a time, each having its individual compressed air shaker mechanism and the whole system variable and adjustable for dust load without shutting down . . . Also Norblo Standard Bag Type (non-automatic).

Norblo H. E. L. S. Centrifugal Systems

A cyclone or centrifugal type collector for all materials, from sawdust to fly ash; characterized by high efficiency of collection with low static drop. The Norblo H. E. L. S. has no internal vanes, gadgets or dampers. High efficiency is obtained by scientific proportioning and by the patented (No. 2,259,919) expanding nozzle. These design features eliminate the power-wasting back eddy. Built in standard sizes with capacity up to 37,500 cfm.

Norblo Hydraulic Systems

A high efficiency, wet type collector, for separation of dust mixed with smoke or fumes. In most installations the Hydraulic unit is used with a Norblo Cyclone collector, thus reducing the amount of wet sludge to be handled. No moving parts. Filter beds are coke or high-fired ceramic tubes, light weight and kept in motion by ascending air stream. Beds are self-cleaning. Built in standard sizes with capacities up to 26,000 cfm.

Take advantage of the efficiency and low maintenance available through Norblo Equipment in these three proved systems of dust and fume collection. Write for full information.

The Northern Blower Company
6407 Barberton Ave., Cleveland 2, Ohio • OLympic 1-1300

Norblo ENGINEERED DUST COLLECTION SYSTEMS FOR ALL INDUSTRIES

Enter 38 on card, page 167

• An arresting little booklet recently issued by the National Safety Council is the matchbook folder shown above. To point up the seriousness of fire hazards, the compilers of the clever folder state that every day fires in this country claim 17 lives, cost hundreds of jobs, and cause damage to the extent of $800,000 in industrial property—all because of carelessness. Single sample copies of THIS'LL BURN YOU UP and information on quantity prices may be obtained from the National Safety Council, 425 N. Michigan Avenue, Chicago, Ill.

St. Lawrence Cement Tops Estimated '57 Sales by 25%

Production and sales from the two plants of the St. Lawrence Cement Company, located at Villeneuve, Que., and Clarkson, Ont., for the first 10 months of 1957 topped the 4,000,000 bbl. figure estimated for the entire year by directors.

Combined sales of the two plants will total approximately 5,000,000 bbl. in 1957—25 percent above the predicted estimate and 500,000 bbl. more than the rated normal capacities of the plants, according to directors.

The company's Quebec plant is rated at 1,500,000 bbl. and the Clarkson plant at 3,000,000 bbl. annually. The second unit at Clarkson began operations in March.

Canadian Cement Producers Ship Record 26,764,480 Bbl.

Shipments of portland cement made by Canadian producers again reached a record level in the month of September and for the nine-month period ending September 30, 1957.

In September, 1957, shipments of 3,823,783 bbl. of cement were reported, 1,300,000 bbl. more than in the same month of 1956.

The total of 26,764,480 bbl. shipped in the first nine months of 1957 compares with 22,002,411 bbl. shipped in the nine months ended September 30, 1956, an increase of 21.6 percent.

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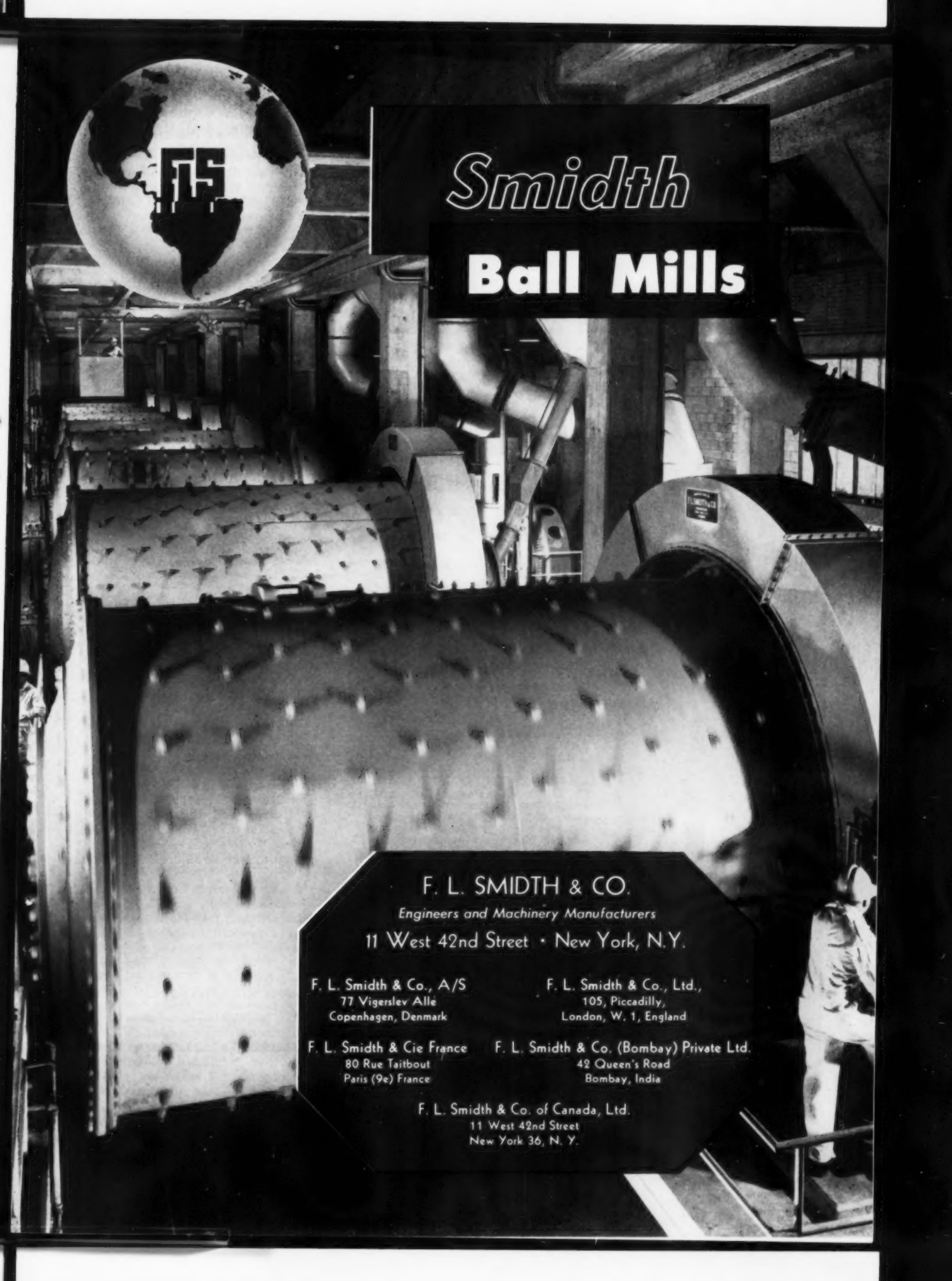
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New York 36, N. Y.

Dustless Dallas Plant Inspected by Officials Of Lone Star Cement Co.

Officers and directors of the Lone Star Cement Company and local officials recently inspected the firm's improved dustless plant in Dallas, Tex.

Highlights of the tour were the new electrostatic precipitator, which removes solid particles and impurities from the kilns, and a new rock ripper which tears rock from a quarry, making blasting unnecessary. The $1,400,000 precipitator has been in service since August, and will cost between $70,000 and $85,000 a year to operate.

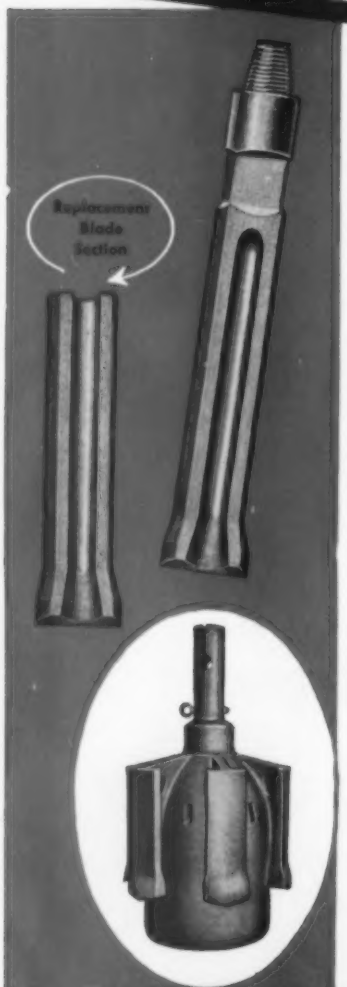
The new equipment, which eliminates complaints concerning kiln dust and noise from quarry blasting, represents a part of a recently completed expansion program making the Dallas plant the largest in the Lone Star system.

WILLIAM W. KARL was appointed sales manager of Lehigh Materials Company, Tamaqua, Pa., replacing William F. Atkins, who resigned.

SPANG

BLAST HOLE BITS

Drill More Holes Per Bit, At Less Cost Per Hole



SPANG CHURN DRILL BITS, famous for long life and economy in the drilling of blast holes for the fragmentation of minerals or overburden, drill *more-holes-per-bit* at *less-cost-per-hole,* because they are fully heat-treated from end to end and have the *extra strength in pin and blade sections* to stand up under the toughest drilling conditions. They are made with semi-dressed ends for quicker, easier finish-dressing, in High Carbon, A.I.S.I. 4340, and Spang Molloy Steel.

Available also, as an added economy, are SPANG REPLACEMENT BLADE SECTIONS in the same grades of steel, and uniform forge section, for welding to pin and collar sections of original bits when long service has worn the integral blade to a point where replacement is desirable.

Anyway you look at it, SPANG BITS are your best buy for more holes at less cost per hole.

SPANG REAMER TYPE PILOT BITS FOR DRILLING LARGE DIAMETER HOLES

Can be supplied in all sizes and in any practical weight.

For information on SPANG BITS, and FREE CATALOG of Complete Line of SPANG Cable System Drilling and Fishing Tools, consult your nearest Dealer, or write direct to:

SPANG & COMPANY

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For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Water Wells, Prospect Drilling and Shot Blast Holes.

Enter 40 on card, page 167

Multimillion-Dollar Facility Of Arkansas Cement Corp. To Be Built at Foreman

Ground-breaking ceremonies were held recently at Foreman, Ark., when construction work was begun on the new plant of the Arkansas Cement Corporation, a wholly-owned subsidiary of the Arkansas Louisiana Gas Company. Cost of the installation is expected to be between $12,000,000 and $15,000,000.

Governor Orval E. Faubus of Arkansas turns the first spadeful of dirt in ground-breaking ceremonies for the $12,000,000 plant of the Arkansas Cement Corporation. At the left is W. R. Stephens, Little Rock, board chairman of the Arkansas Louisiana Gas Company, and at the right, W. T. Murphy Jr., Texarkana, board chairman of Arkansas Cement.

The Foreman plant, designed by Kaiser Engineers of Oakland, Calif., is scheduled to be in production about October 1, 1958. Kaiser will also be in charge of construction. The designed capacity of the new facility will be 1,400,000 bbl. annually; and at that rate the proved deposits of raw materials near the plant site will be sufficient for 200 years.

Arkansas Cement Corp. is headed by W. T. Murphy Jr., chairman of the board, and J. C. Hamilton, president. Other officers include the following: E. N. Henderson, vice-president; F. L. Holleman, secretary-treasurer; and R. H. Thornton Jr., assistant secretary-treasurer.

The Mt. Eaton Limestone Company has completed a limestone crushing plant 2 miles east of Mt. Eaton, Ohio. The plant produces 1,200 tons of crushed rock daily for use in lanes, driveways, and road building.

A.I.M.E. Officers, Directors To Be Installed February 18 At Annual Meeting in N. Y.

Names of elected officers and directors of the American Institute of Mining, Metallurgical, and Petroleum Engineers were announced recently after a directors' meeting in New York. They will be installed at the annual A.I.M.E. meeting in New York on February 18.

Dr. Augustus B. Kinzel, Union Carbide Corp., New York, now president-elect of the institute, will become president for one year, succeeding Grover J. Holt, Ishpeming, Mich., Cleveland Cliffs Iron Co. Howard C. Pyle, Los Angeles, Monterey Oil Co., will become president-elect for 1958, a step toward the presidency in 1959.

Two vice-presidents will take office for one year: Arthur W. Thornton, Pittsburgh, National Tube Division, U. S. Steel Corp., and John C. Kinnear Jr., McGill, Nev., Nevada Mines Division, Kennecott Copper Corp. Mr. Kinnear also will be installed as a director for three years.

Others to become 3-year directors are John P. Hammond, Tulsa, Okla., Amerada Petroleum Corp.; Walter E. Hibbard Jr., Schenectady, N. Y., General Electric Co. Research Laboratory; Elmer A. Jones, Bonne Terre, Mo., St. Joseph Lead Co.; Basil P. Kantzer, Houston, Tex., Union Oil Co. of California; and Stanley D. Michaelson, Salt Lake City, Western Mining Division, Kennecott Copper Corp.

John C. Fox, secretary of the Society of Mining Engineers of A.I.M.E., was appointed to the additional office of assistant secretary of A.I.M.E. Donald Tone was named assistant secretary of the Society of Mining Engineers. F. W. Stratt becomes managing editor and James J. Burke associate editor of the *Journal of Metals*. Rexford A. Beals is editorial director of this publication, and also of *Mining Engineering*.

At this time it was announced that, effective February 18, the Mining, Geology, and Geophysics Division of the Society of Mining Engineers of A.I.M.E. will be known as the Mining and Exploration Division. Unit committees representing various activities of the divisions will be named.

Headquarters of the annual meeting of A.I.M.E.'s Society of Mining Engineers and Society of Petroleum Engineers will be in the Statler Hotel in New York. Sessions of the Metallurgical Society will be held in the Sheraton-McAlpin. Convention dates are February 16 through 20.

Universal Atlas Cement Co. Receives 2 Safety Citations

The Northampton (Pa.) plant of the Universal Atlas Company, New York, N. Y., received citations from the National Safety Council and the Portland Cement Association, Chicago, for operating a year, its 11th, without a disabling injury. The plant is said to hold the all-time-high safety record in the cement industry.

During the awards program at Northampton a safety monument was unveiled on the plant grounds. The National Safety Council Award of Merit on behalf of the Company was accepted by Ray W. Smith, plant manager; and Fred Reiter, plant safety supervisor, received the P.C.A. citation from Ivan LeGore, P.C.A. safety director.

Admission to the Thousand-Day Club of the Portland Cement Association was granted to the Mitchell, Ind., plant of the Lehigh Portland Cement Company recently upon completion of 1,000 consecutive days of safe (accident-free) operation.

ADVANCE WITH McCARTER

HIGHWAY ASPHALT COMPANY, PLYMOUTH MEETING, PENNSYLVANIA
Richard L. Evans, President

A REVOLUTIONARY NEW ASPHALT PLANT

HIGHER CAPACITY • LOWER COST

Ruggedly built McCarter plants are tops in speed, production and portability. Advanced designing and flexibility guarantee lasting profitable service.

▶ M-6000 STATIONARY
Capacities of 150 to 200 T.P.H.
▶ M-5000 STACK-UP
Capacities of 100 to 135 T.P.H.
▶ M-2000 PORTABLE
Capacities of 60 to 70 T.P.H.

THE McCARTER IRON WORKS, INC. NORRISTOWN, PA.

Enter 41 on card, page 167

PREVENTIVE MAINTENANCE REPORT:

Dayton V-Belts Still Running After 2 Years in Quarry's Destructive Rock Dust

"Dayton V-Belt Drives operating 54 hours a week the year 'round, with no downtime . . ."—Arthur J. Arndt, Superintendent, A. G. Kurtz & Sons, Inc., quarry at Denver, Pennsylvania.

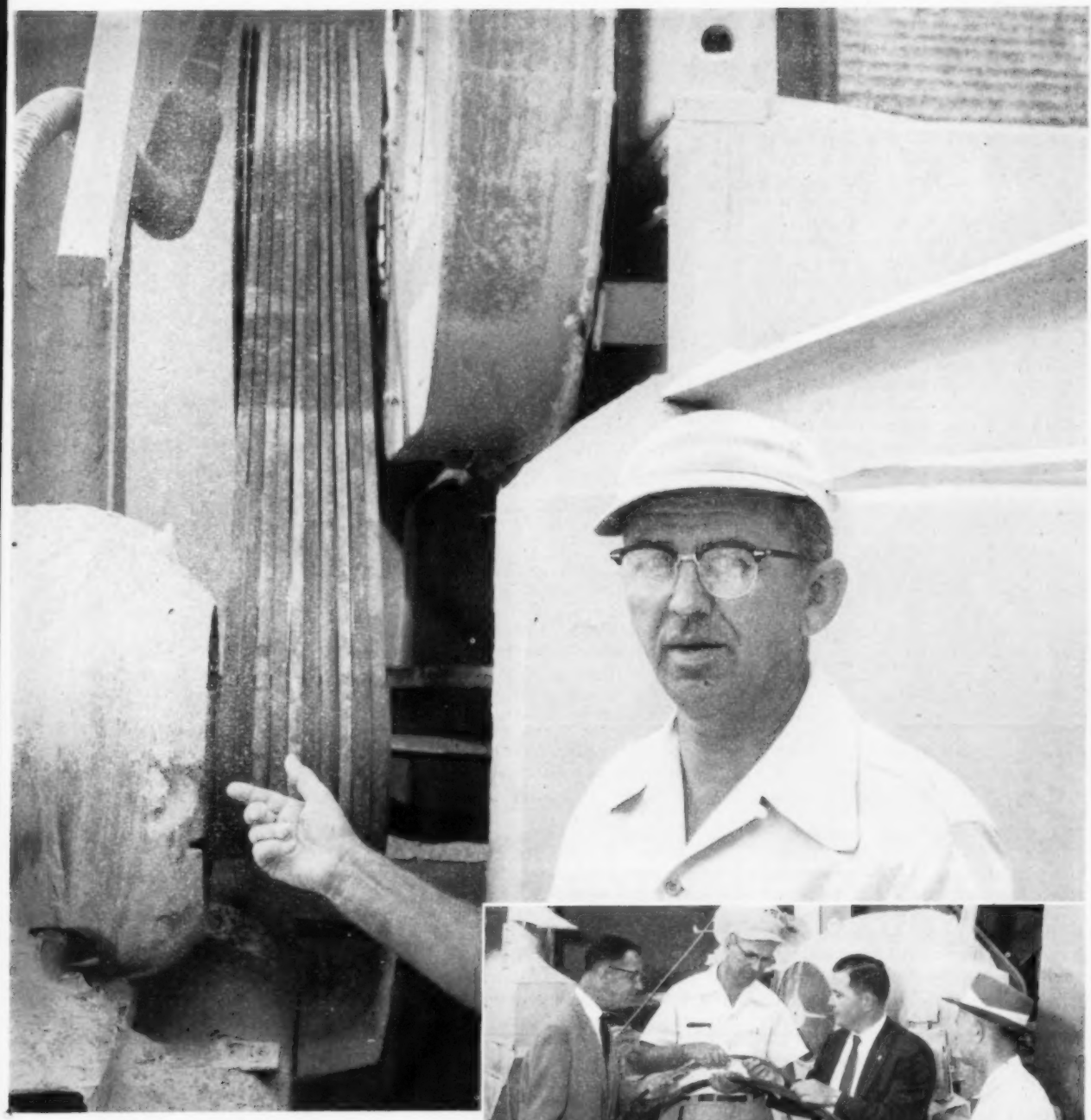
"Not a single one of our 60 Dayton V-Belts has failed on its own account or caused a minute's downtime in over two years," reports Mr. Arthur J. Arndt, quarry superintendent for A. G. Kurtz & Sons, Inc. "When you consider that we're running 54 hours a week the year around, that's proof enough that Dayton V-Belts stand up under the toughest types of quarry operation.

"Downtime, of course, would mean a serious loss. Ours is a continuous operation and 23 men are idled while a drive is stopped. Although a set of V-Belts costs $200, it is nothing compared to the downtime costs.

"It's reassuring to know that we can protect ourselves from such heavy expense by relying on high quality, multi-matched Dayton V-Belts. And when we do need a replacement, our local Dayton Distributor, Raub Supply Co. in Lancaster, is always ready to deliver a matched set in half an hour.

"We protect our Dayton V-Belts as well as we can with stone guards and good preventive maintenance but we can't combat the abrasive grit and dust that's always present in a quarry. That's why we've used Dayton V-Belts for over 10 years—they've proved they can last on a job that chews up other V-Belts."

For more information and help in solving your power transmission problems, see BELTING in the Yellow Pages for the name and phone number of your nearest Dayton Distributor. Or write the Dayton Rubber Company, Industrial Replacement Division, Dayton 1, Ohio.



"Destructive rock dust is everywhere in a quarry, yet a matched set of Dayton V-Belts will last at least two years without downtime." Examining some Dayton V-Belts from A. G. Kurtz's reserve stock are (l. to r.) Kenneth N. John, Raub Supply Co., the Dayton Distributor; Arthur J. Arndt; John C. Morgan, the Dayton representative; and Harry K. Kurtz, President, H. G. Kurtz & Sons, Inc.

(C) D.R. 1958

Dayton Rubber *World's Largest Manufacturer of V-Belts*

Dayton Rubber Company, Industrial Replacement Division, Dayton 1, Ohio

$20,000,000 Plant Opened By U.S. Borax & Chemical At Mojave Desert Deposit

On November 13 the U. S. Borax and Chemical Corporation, Los Angeles, dedicated its new open-pit mine and refinery near Boron, Calif., in the Mojave Desert. The mine area covers about 80 acres of the largest deposit of sodium borate known in the free world. Completion of the $20,000,000 mining and processing facilities required about two years.

U. S. Borax and Chemical Corp. was formed in 1956 by the merger of the Pacific Coast Borax Company, Los Angeles, and the United States Potash Company, Carlsbad, N. M. The firm is now composed of four divisions, one each for borax and potash, another for 20 Mule Team products, and a fourth for research.

Huron Portland's "Townsend" To Undergo Alterations

Among the current projects of the Huron Portland Cement Company is the enlarging of its 338-ft. bulk cement carrier, the *Paul H. Townsend*. The vessel was purchased by Huron from the U. S. Maritime Commission in 1951. Two years later the conversion work had been completed, and the *Townsend*, named for the company's president and treasurer, went into service.

Plans for the lengthening of the carrier call for the insertion of a 108-ft. section between frames 90 and 91, to give the ship a 446-ft. length. Carrying capacity of 5,200 gross tons will be increased to about 45 percent.

Three tiers of new deck houses are to be added to the forecastle deck forward. Other installations will include new mooring and steering gear and a revised ballast system.

• Ronald C. Griffin, retired production manager of the Consolidated Rock Products Company, Los Angeles, Calif., is now associated with the Arthur E. Howland Company, Engineers, Los Angeles. Mr. Griffin will serve as consultant to the pit-and-quarry industries.

Record Limestone Tonnage Shipped by Mich. Limestone Div.

Despite a short shipping season on Lake Michigan in 1957, the nine self-unloaders of the Bradley Transportation Line set a new record of 11,500,000 tons of limestone, clinker, and iron ore for the Michigan Limestone Division. Addition of the *Cedarville* and the *Myron C. Taylor* was responsible for the high total.

Shipments of stone are delivered by these vessels from the Michigan Limestone Division's (U. S. Steel Corp. subsidiary) quarries at Rogers City and Cedarville, Mich., to the Great Lakes area. A total of 2,500,000 tons of dolomitic limestone was shipped from Cedarville alone.

Cost of Alpha's Ninth Plant To Exceed $18,000,000— Capacity, 2,000,000 Bbl.

According to word from official sources of the Alpha Portland Cement Company at Lime Kiln, Md., the total cost of the firm's new facility there, which is expected to be in operation next summer, will exceed $18,000,000. Capacity of the plant will be 2,000,000 bbl.

It was announced that dust collectors will be installed at a cost of $700,000, and the latest safety measures will be taken to guard against accidents. This operation will be the ninth Alpha plant and the third-largest of the group. With the expected 2,000,000 bbl. produced at the new plant, Alpha's total yearly capacity will be increased to 12,800,000 bbl.

$3,000 Safety Award Shared By N. Y. Trap Rock Plants

Two New York Trap Rock Corporation plants have won a total of $3,000 in cash awards in the company's three-year-old safety incentive program.

Employees at the Tomkins Cove (N. Y.) plant have set a record high by completing 600,000 man-hours on the job without a lost-time accident. An award of $2,000 will be shared by the 125 men at the plant on the basis of the number of hours each has worked during the last period of 100,000 man-hours.

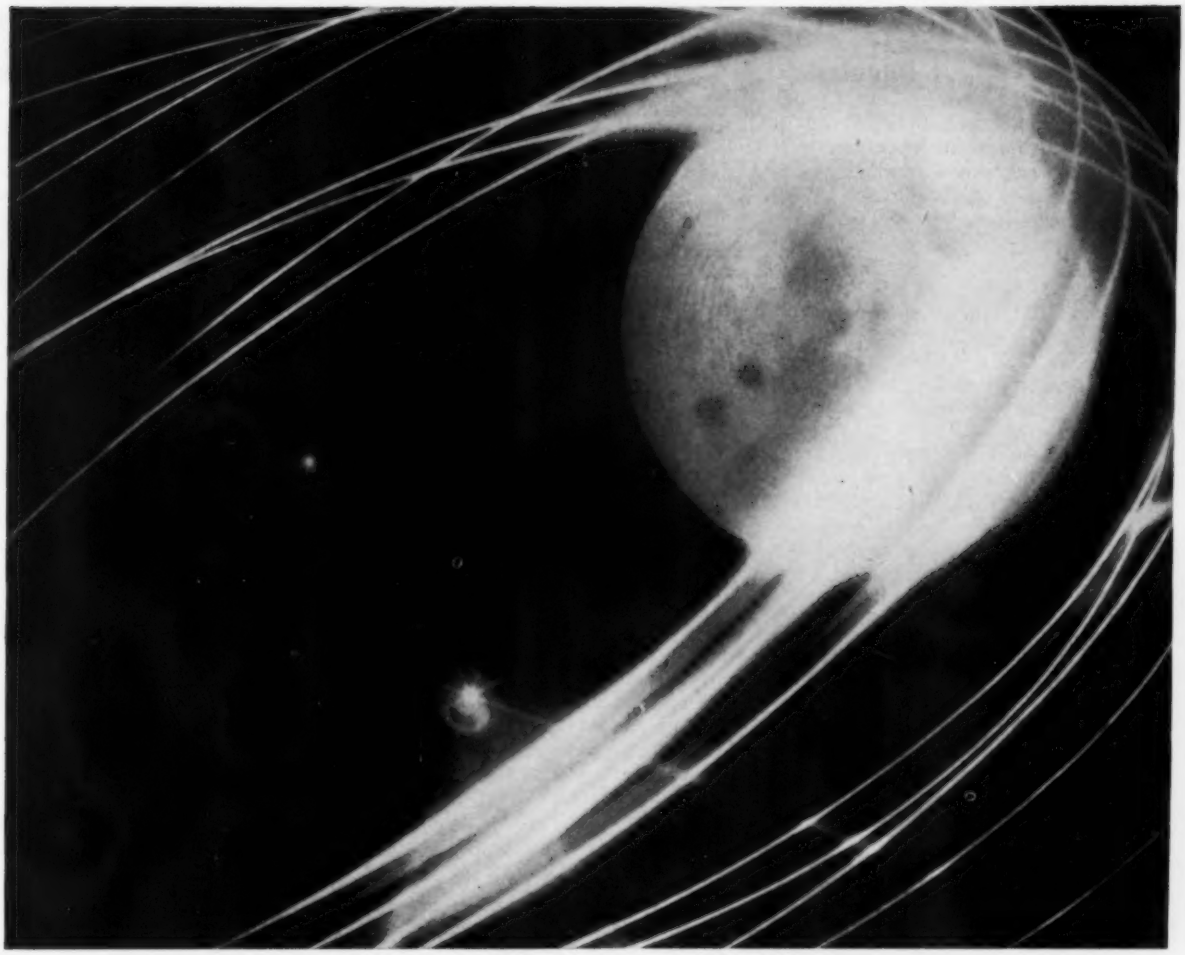
This is the first time that any of Trap Rock's five installations has completed six consecutive periods without a lost-time injury since the plan was started. The last lost-time accident at Tomkins Cove was in September, 1955. Men working there have shared a total of $8,000 in cash awards since then.

The Clinton Point (N. Y.) plant's 165 employees are sharing $1,000 for completing 100,000 man-hours without a lost-time accident on the basis of the number of hours each worked during the accident-free period which began July 19, 1957.

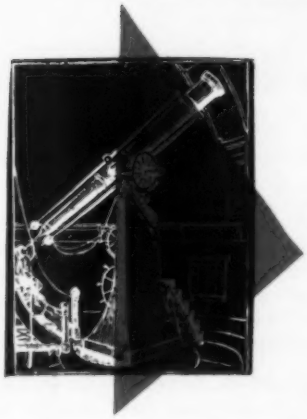
Participating in the program were 540 men employed at the firm's four quarries and Newburgh shipyard.

• The Stockport Sand & Gravel Company, Stockport, Ohio, uses this LeTourneau - Westinghouse D Tournapull scraper for supplying gravel to a dragline. The D begins its cut at the top of the bank of the pit, dropping its blade and loading downhill — an incline of about 60 deg. The material is spread in front of a dragline bucket on a cable, which carries it to the conveyor belt leading to the hopper for crushing and processing.

Sale of the Rogers and Kuni gravel processing plant in North Bend, Oreg., to the Umpqua River Navigation Company was announced recently. The new owner, Howard Hinsdale, stated that four LSM-type barges will be put into service, each having a minimum capacity of 600 cu. yd.



ARE CROWN MULTIWALLS REALLY SUITABLE FOR SPACE TRAVEL?



The problem of how best to ship mortar-mix to Mars may very well confront packaging experts in the next decade or so. When that time comes, will Crown Multiwalls be the ideal container for the job? Will they be meteor-resistant? Can they withstand blast-off?

We're not trying to answer these questions—yet. Frankly, we're too busy assuring the bright future of Crown Multiwalls in *other* ways.

To guarantee a perpetual source of supply, for instance, Crown Zellerbach maintains its vast forest reserves by planting nearly 15 million seedlings every year.

To meet the ever expanding market, new Crown Multiwall Bag Plants have recently been constructed—one in Antioch, California, the other in Bogalusa, Louisiana.

To keep abreast of new manufacturing concepts and new packaging ideas, Crown Zellerbach is constantly modernizing and improving its facilities.

These things all add up to the fact that Crown Multiwalls really *are* shooting for the stars—in quality, in service, in dependability. And when the time comes for space travel in its literal sense—we'll be ready for that too.

CROWN ZELLERBACH CORPORATION

SALES OFFICES: ATLANTA • BIRMINGHAM • CHICAGO • COLUMBUS • DALLAS • DENVER • HOUSTON • KANSAS CITY
LOS ANGELES • MINNEAPOLIS • NEW ORLEANS • NEW YORK • PORTLAND • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • ST. LOUIS

Enter 45 on card, page 187

5th Philippine Cement Plant Opened Last Summer To Have Output Doubled

The Republic Cement Company's plant at Norzagaray, Bulacan, Luzon, the fifth cement operation in the Philippines, is now producing at a peak capacity of 10,000 bags (94-lb.) per day. The plant was opened last summer.

Present production is approximately 750,000 bbl. annually, which will bring Philippine cement output by about 29 percent over the 1956 production (2,616,795 bbl.) to about 3.4 million bbl. Republic's operation is the only dry-process plant in the Islands.

Plans are already being made to install additional machinery which will double present capacity to 20,000 bags daily, or about 1.5 million bbl. Complete conversion to the 100 percent increase is slated to be finished in about 14 months. Estimated cost of the additional machinery is $1,500,000.

Production of cement in the Philippines has been rising steadily since 1945, with the exception of 1953, but there is still a cement shortage because of the widespread public and private construction.

Carolina Giant Expands Plant, Adds Mortar Cement to Line

Carolina Giant Cement Company, Harleyville, S. C., recently completed an expansion program of $5,000,000 and announced it would shortly begin marketing a new product—mortar cement.

A major item included in the expansion at the plant was a third kiln, 350 ft. long. Other additions are ten 10,000-bbl. concrete storage silos, each 100 ft. high and a new finish department system consisting of an 11½- by 17-ft. cylindrical mill in closed circuit with an air separator.

The new equipment has boosted production capacity from 800,000 to approximately 3,076,000 bbl. per year, a fourfold increase. This is about 33,600 bags per day.

With expansion completed, the company will begin manufacturing mortar cement under the trade name of Giant Mix Masonry Cement, in addition to the four types of cement presently manufactured. The marketing area of the Carolina Division includes both Carolinas, and portions of Georgia and Florida.

The plant operates on a three-shift, around-the-clock basis. It is served by the Atlantic Coast Line and Southern railroads. An approximate total of 5,800 hopper cars (for bulk cement shipments) and 4,200 box cars (for bagged cement) are necessary to ship the plant's yearly production.

It is estimated that at present capacity, the marl deposits on the Harleyville property will last for at least 75 years, and the amount of usable clay for more than 15 or 20 years.

The Springfield Crushed Stone Company has installed a new 1,500-t.p.d. portable crushed limestone plant near Springfield, Ohio. The plant is operated by Carl Rockhold, Walter Rockhold, and E. F. Patton, partners. Jim Hale is plant superintendent.

● The largest single shipment of kiln sections enroute to Cementos Portland del Bajio, S. A., Leon, Mexico, from Allis-Chalmers West Allis Works is this portion of a 21-car shipment. These sections are for a 12 by 350-ft., five-support dry-process kiln being supplied, along with related equipment, for an extension of this Mexican plant. Five railways handled the shipment.

Dept. of Commerce Issues Report on Proceedings Of Emergency Conference

Proceedings of a conference of industry executives on the problems which might confront industrial management and the nation in the event of an enemy attack have just been published. The report is available to the public through the Office of Technical Services, U. S. Department of Commerce.

At the conference, 38 high-level industry officials discussed what has been done, is being done, and should be done to insure continuity of industrial production, management, and supply during a national emergency. The meeting was held in February, 1957, under the auspices of the Business and Defense Services Administration, U. S. Department of Commerce.

The review of the proceedings, PB 131300 *Industry Planning for the Continuity of Production in the Event of Enemy Attack*, Business and Defense Services Administration, U. S. Department of Commerce, Feb., 1957, may be ordered from OTS, U. S. Department of Commerce, Washington 25. Price, 50 cents per copy.

Obituaries

A. Rex Moberley, 62, manager of the Rio Grande Gravel Company, died recently at St. Luke's Hospital in Wheat Ridge, Colo. He had been with the firm for 11 years.

Nicholas Cascetti, 77, president of the Stowe Traprock Company and Superior Ready Mixed Concrete Company, both of Oreland, Pa., died recently in Pennsylvania Hospital.

John D. Husen, 32, vice-president in charge of sales of the Janesville Sand and Gravel Company, Janesville, Wis., died of a heart attack in Minneapolis.

Pierce A. Snyder, who founded and incorporated the Columbia Silica Company and served as its president and treasurer, died recently in a hospital in Akron, Ohio. He was 76 years old. The silica business was acquired some time ago by the Minnesota Mining and Manufacturing Company.

for aggregate handling, use

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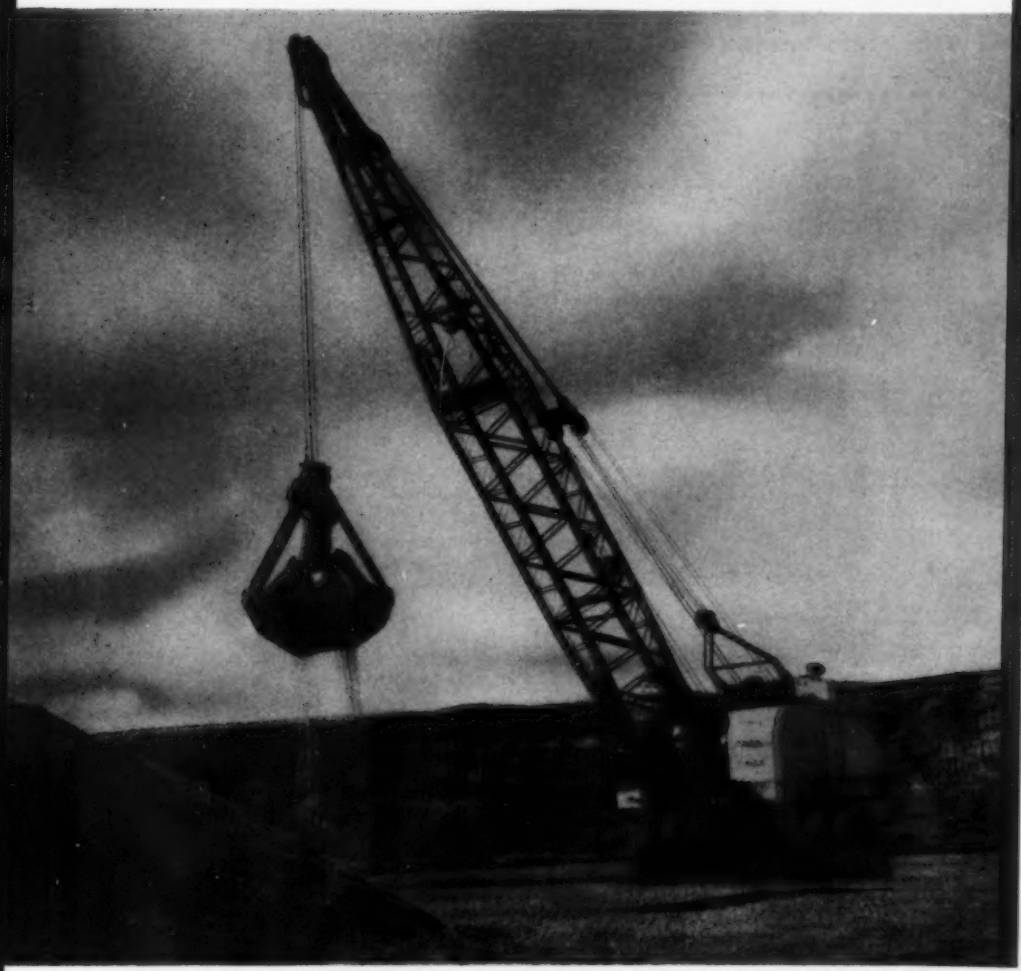
experience



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power is not in durability alone

ORTON cranes have long been famous for durability; ORTON steam cranes are still in use; ORTON users are reluctant to part with rugged, easy-to-maintain ORTON work horses.

But this is not the most important ingredient you buy with an ORTON. You get the benefit of more than 50 years experience, *applied*—TO—*YOUR*—CRANE!

EXPERIENCE means a great deal . . . especially at ORTON where "production-line" manufacture is maintained only so long as the cranes on the line are engineered to the latest, *proved* design for *your* job. For, since Orton can't build *all* the cranes, it builds only the best.

ORTON, *first* with *Torque-Control*, *first* with air-operated controls, *first* to apply new techniques *which have been proved*, is also the *first* to recognize that *each handling job is unique*, thus, an ORTON crane is built for *you*—*your* job—*your* specification.

Consider ORTON first—it *is* first.

***EVERY* ORTON CRANE has:**
. . . ALL power shafts carried on sealed anti-friction bearings—NO exceptions.
. . . ALL motion entirely independent.
. . . NO jaw clutches—not even in travel mechanism.

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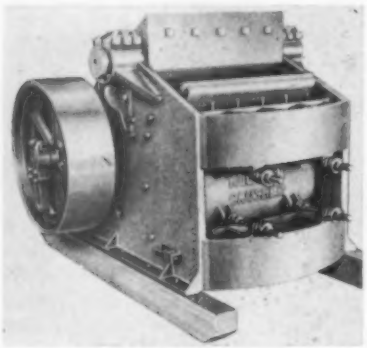
608 S. Dearborn Street
CHICAGO 5, ILLINOIS

THE MOST POWERFUL NAME IN CRANES

Enter 47 on card, page 167

New Machinery
and Equipment

For Further Information Use Card on Pages 167-168



● Straub Manufacturing Company, Inc., introduces its new No. 105 series of Kue-Ken crushers. Known as the "Rockeaters," the heavy-duty units provide increased capacity for gravel or secondary crushing.

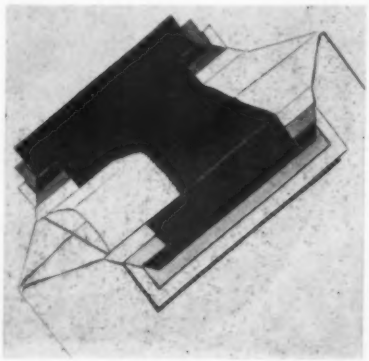
Rockeaters are available in four sizes—42 by 8 in., 42 by 10 in., 42 by 12 in., and 42 by 14 in. Capacities range from 50 t.p.h. to 125 t.p.h. **(51)**

● Latest addition to the LeTourneau - Westinghouse equipment line is this 18-cu. yd. scraper for use with tractors of 90 hp. and up.

The new unit, designated the CT Scraper, features a clean, smooth bowl interior for minimum resistance in loading and unloading. The bowl floor measures 59 in. from the tip edge of the cutting blade to the face of the tailgate, minimizing the distance material must travel in the loading process.

The CT's 9½-ft., three section blade is angled precisely with the floor to further offset loading resistance. The scraper bottom remains nearly flat in loading so that material does not travel up-hill to enter the bowl.

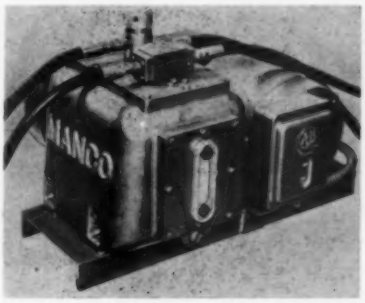
To provide maximum "roll" and "boiling" action in the loading process, the CT features a specially curved deflector plate and anti-spill grid on the top of the tailgate structure. **(52)**



● St. Regis Paper Company's new "super stepped" multiwall bag is manufactured with the plies slit in staggered positions to give added strength and siftproofness.

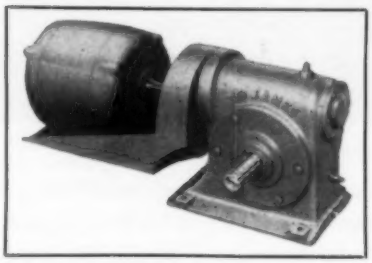
For example, in a four-ply "super stepped" bag, the plies are staggered as for the regular stepped end bag. Then the slits made to form the top and bottom are staggered in three different positions, and the plies are pasted together. Since each of the three inside plies is bonded together, as well as the outside ply, a tighter bottom closure results. The bags are manufactured without removing paper from the corners and exposing the natural kraft plies to attack by the material being packed. The slits of the bag can be staggered by varying degrees to obtain the best results.

The super stepped bag also features a new valve insert which provides for smooth operation when the bag is placed on the tube of the packer. **(53)**



● A new hydraulic power and pump package unit, designated Model HA-1, has been developed by the Manco Manufacturing Company for operating high pressure hydraulic equipment. Among the features of the new unit is its adaptability to varying requirements in the range from 4.1 g.p.m. at 5,000 p.s.i. to 3 g.p.m. delivery at 8,800 p.s.i.

Safety features include an internal safety relief valve preset at 9,000 p.s.i. and a thermal overload protector on the pump motor. **(54)**



● D. O. James Gear Manufacturing Company now has available the Type RS Motoreducer in new right angle drive. Made in 13 sizes, the Type RS has horsepower ratings ranging from ⅓ to 30 hp., and output speeds from 11.5 to 310 r.p.m.

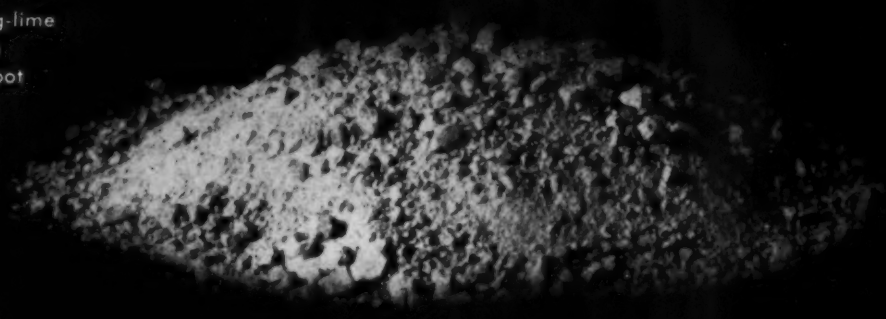
Also available is a new in-line drive, the Type MS, with 1 to 75 hp., and output speeds from 1.5 to 190 r.p.m.

Both types can be powered by any standard foot-mounted N.E.M.A. motor in any make or type. **(55)**

Enter 48 on card, page 167 →

Enter 47 on card, page 167

Coarse grades of ag-lime take longer to reach the plant's feeder root zone and are less desirable.



Ag-lime FINES bring more money

Fine grades of ag-lime bring almost twice the market price and are in great demand

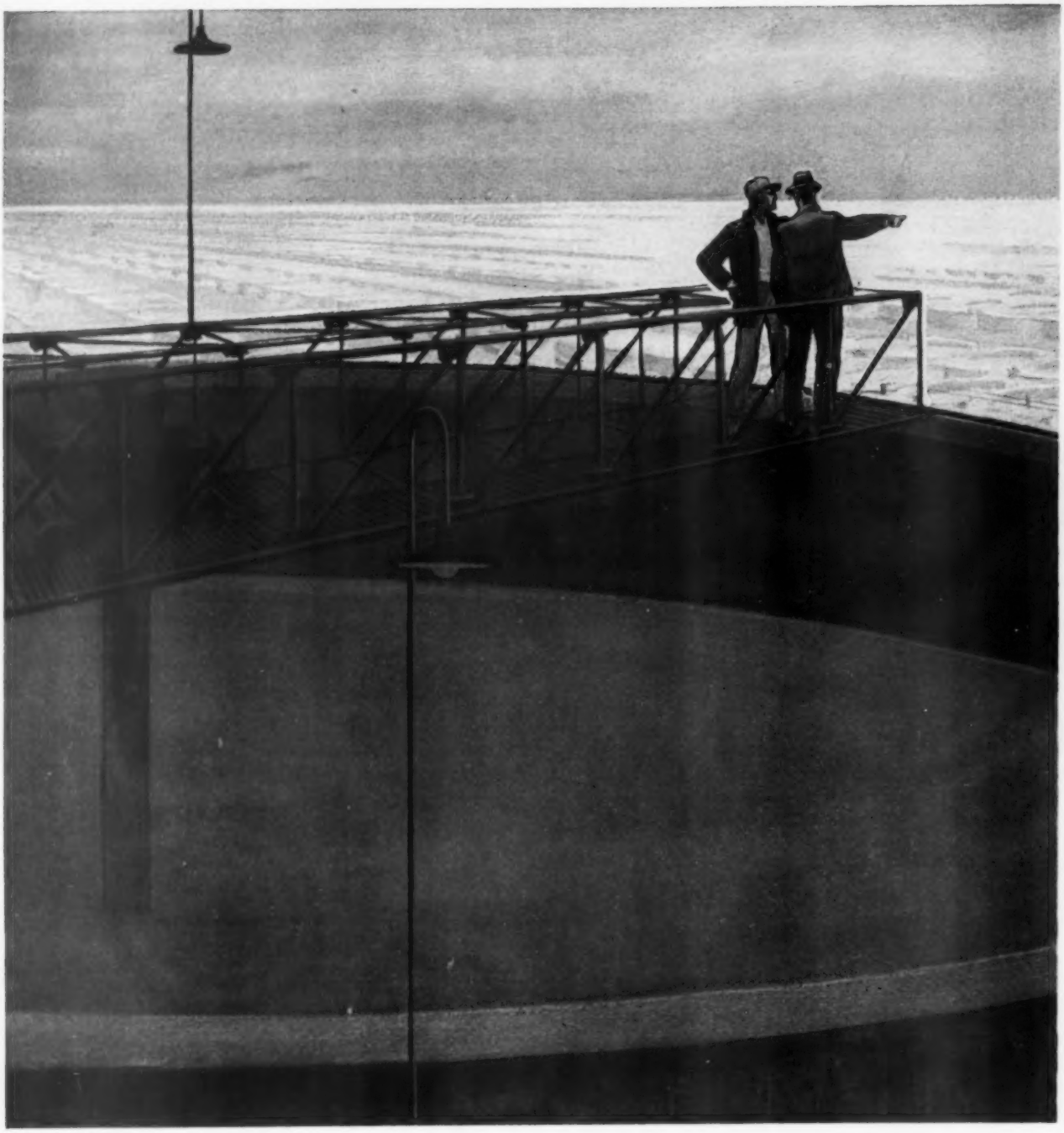
(Eagle's portable cage mill at work on property of John W. Karch Stone Company, Celina, Ohio.) The purchase and installation of this plant resulted from a Karch sample being processed into an improved product through an Eagle Cage Mill. Completely satisfied with the results, this machine is now producing approximately 25 tons per hour—easily meeting all state specifications.

You can pick up the steady big premiums on finer ag-lime. Today's scientific farming demands this grade of ag-lime, which, because it is absorbed faster, can recover the investment faster with cash crops.

EAGLE CAGE MILLS produce more fines! A single pass Eagle four-row cage mill with its high-speed impact, disintegrating action using hard-faced bars, not only produces a finer aggregate—it increases the tonnage as well! The single pass design has been producing this superior quality ag-lime at an average rate of 30 tons per hour, subject to variations in raw material and weather conditions.

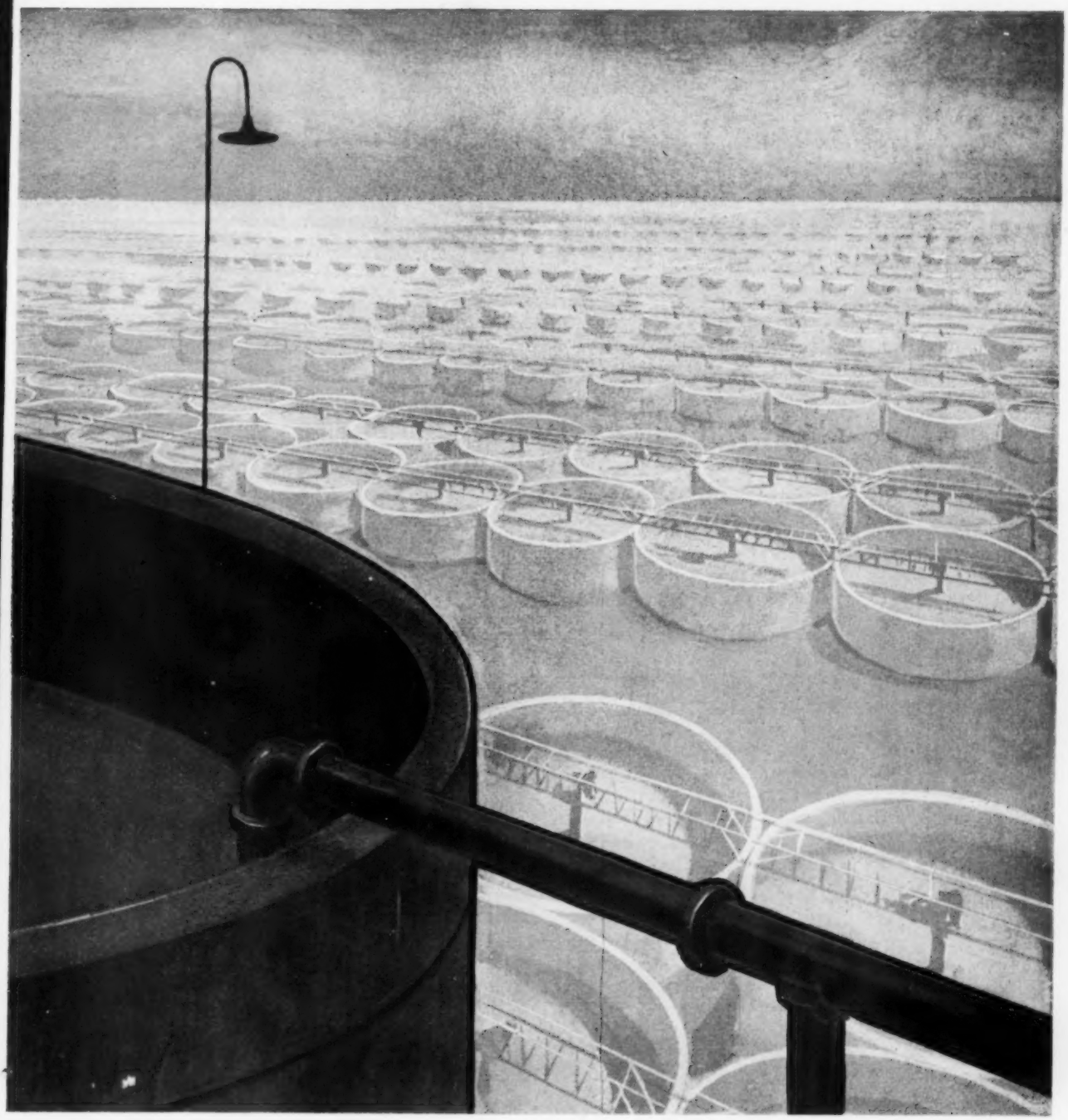
EAGLE
JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS
CRUSHER CO., Inc. GALION OHIO·U·S·A

Special offer ... send us a sample (200# to 500#) of your pit-run ag-stone, *freight collect*, for Eagle's gradation improvement test. We will put it through an Eagle Cage Mill, make a product report, and ship the resulting ag-lime back to you for your inspection. You're welcome to be on hand when the batch is processed, if you can make it. No obligations of any kind. We are convinced an Eagle mill can make more money for you and want to prove it to your satisfaction!



*Registered trademark

You'd need 2,134 thousand-barrel the extra slurry ground by one set of



tanks to hold Ni-Hard liners

You would never build – or see – this many slurry storage tanks, of course.

But think of it! It *would* take 2,134 thousand-barrel tanks to hold just the *extra* ground stone production one cement producer got from a single set of wear-resistant Ni-Hard* liner segments. And his experience is not unusual. Why not make it yours? Ni-Hard mill liner segments are available from authorized producers throughout the country.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

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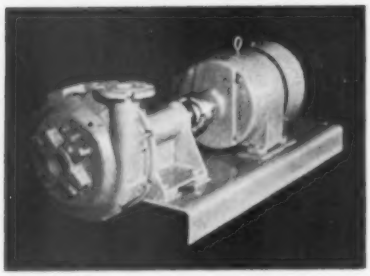
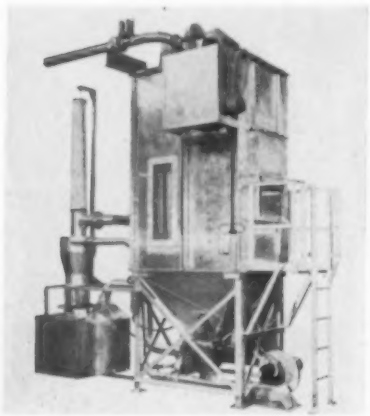
NICKEL ALLOYS PERFORM BETTER LONGER



● Morris Machine Works has developed a new medium range, high-speed slurry pump, known as the Type BA, for handling suspensions of sand, lime, slurries, etc., and for other applications in which abrasion resistance and high speed are required.

Built in 1-, 1½-, 2-, 3-, and 4-in. sizes, the BA pump is available in cast iron, Ni-hard, or stainless steel. This new pump features a renewable suction liner and semi-open impeller, and is easy to dismantle and re-assemble. **(56)**



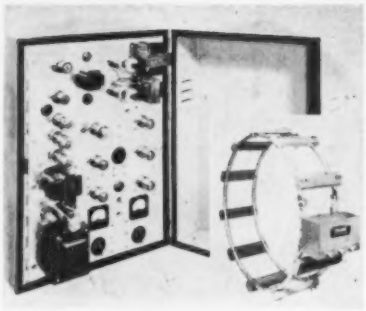
● Dracco Corporation has introduced a new glass-bag filter for collecting hot, corrosive industrial dusts and fumes. The filter is able to operate at temperatures up to 660 deg. F., and resists deterioration from all substances except fluorine and hydrofluoric acid.

Several changes in bag-type filter design were made to take maximum advantage of cloth filtration and to assure economical bag life. The filter bags are single-hung tubular type, made of Fiberglas cloth which has been treated for protection against fracture. Adequate spacing between adjacent bags prevents bag contact during shaking. Bag suspension and shaking mechanisms were completely redesigned to assure correct bag hanging tension, minimum wearing action, and gentle, effective shaking.

Air cleaning action is much the same as in other conventional filter designs. Dust- and fume-laden air is drawn into the filter hopper and upward into the bags. Only clean air, 99½ to 100 percent free from visible dust, passes through the cloth. Periodic shaking loosens the particles which fall to the bottom of the hopper to be discharged. **(57)**

● Ford Motor Company offers its 1958 line of trucks, comprising more than 300 models ranging from the Ranchero through light, medium, heavy, extra heavy, and tandem trucks. Models in the 1958 line include several mechanical and design advances, newly-designed grilles, safety dual headlights, customized interiors, and modern styling. Horsepower and payload capacity has been increased in several models.

Illustrated is Ford's 1958 pickup truck, incorporating the Styleside box, which matches the cab in width. **(58)**



● Automatic balance control is a feature of the new Twin Loop electronic metal detector developed by Stearns Magnetic Products. This feature assures stability of the electronic circuit, and eliminates the need for constant observation and frequent adjustment.

The Twin Loop metal detector can be installed on any conveyor system handling non-magnetic materials. The highly sensitive inspection loops will detect tiny metal particles at speeds from 30 to 600 f.p.m. Control circuits can be set to trigger a warning light or other signal, or to actuate a reject mechanism that will divert contaminated products.

The simple control cabinet weighs only 75 lb., and measures 19 by 25 by 11 in., with main fuse, controls, manual reset button, and indicator lights on the front panel.

Twin Loop inspection coils are available in standard 48 in. circular or 10 in. by 33 in. rectangular models. **(59)**

● E. F. Marsh Engineering Company introduces its new tubular frame portable conveyor, which features push-button control of a hydraulic transmission system. The hydraulic system is used to drive the conveyor belt, as well as to raise and lower the conveyor to the desired elevation.

Simple hydraulic lines, protected within the conveyor frame, transmit power from its source on the truck assembly to the head shaft. Variable belt speed drive is included. Resetting one hydraulic control immediately selects desired belt speed.

Designed for heavy-duty applications, the basic conveyor features wider frame and face pulleys, and rigid joint construction. It is available in 18 in., 24 in., and 30 in., belt widths. Lengths range from 30 to 60 ft. in 5 ft. increments.

The conveyor features a new axle design of adjustable width, pneumatic-tired swivel wheels, standard loading hopper, head pulley lagging, belt wiper, and tow hitch. **(60)**

Enter 53 on card, page 167 ➔

NEW SLIDE RULE

Free

JAW CRUSHERS
GYRATORY BREAKERS
CAPACITY and SCREEN ANALYSIS of PRODUCT from CRUSHERS
CAPACITY TONS PER HR.
SIZE OF CLEAR SQUARE SCREEN OPENING
PER CENT PASSING
TELSMITH
SMITH ENGINEERING WORKS MILWAUKEE, WISCONSIN, U.S.A.

gives you

CRUSHER CAPACITIES and a SCREEN ANALYSIS of the crusher product

● For the first time—a handy slide rule with all the information you need to select the right crusher or crushers for your particular requirements. It gives the capacity for all sizes of Telsmith Jaw, Gyratory, Gyrasphere, and Intercone Crushers. It shows a Screen Analysis of the product from each of these crushers when set with any proper discharge opening. It will help you pick and buy the best and most economical type and size of crushers for your aggregate plant, or mill. No more reading complicated charts or tables. Here's all you need—in quick easy-to-read form.

HOW TO GET YOUR SLIDE RULE

Call at the Smith Engineering Works Booth at the Sand and Gravel or the Crushed Stone Association Convention at Chicago in February—sign a card and your free slide rule will be mailed to you . . . or, a request to Smith Engineering Works, Milwaukee 1, Wis., on your letterhead, stating your position, will bring you a slide rule with the compliments of Telsmith.

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SMITH ENGINEERING WORKS

504 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

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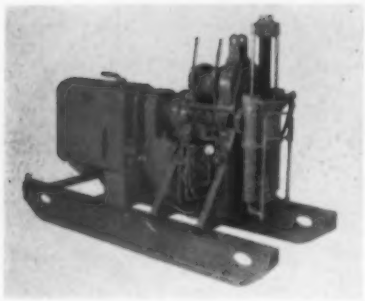


● The Model "JS" core drill, a development of the Penndrill Manufacturing Division, Pennsylvania Drilling Company, is designed with a low center of gravity and wide skids to offer maximum stability when drilling in rough terrain.

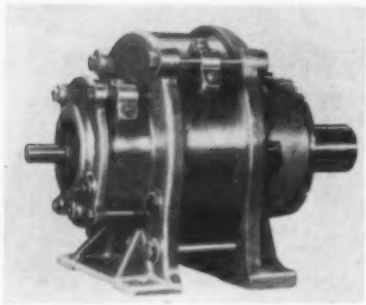
The new drill is powered by a 134 cu. in., 30 hp. gasoline-driven unit, and has a 6 v. electric starting system. It incorporates an integral 20 ft. aluminum derrick and optional cathead, and is offered with either an "AW" or "NW" 24 in. feed hydraulic swivel head. **(61)**

● Butler Manufacturing Company is now offering a bulk system for all free flowing dry granular materials. A complete Butler - Bulk - System is easily developed from prefabricated steel storage tanks and different types of conveying equipment including augers, buckets, elevators, belt conveyors, and pneumatic filling kits.

The all-steel construction of the Bulk - O - Matic keeps dry granular materials safe from contamination and moisture damage, and prevents spillage losses. Rounded corners prevent hang up of product.

Butler bulk tanks are available in a wide range of sizes from 2.1 to 34.8 ton capacities. Bulk-O-Matics are available with 60 degree center discharge suspended hoppers for free flowing materials and side discharge hoppers that induce free flow of materials which tend to hang up.

Bulk-O-Matic tanks can be elevated on structurals for drive-under gravity unloading or above processing machinery. **(62)**

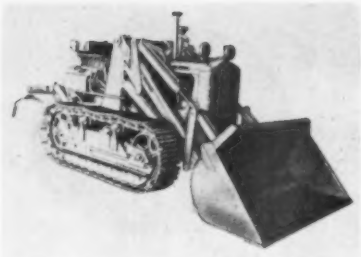


● A new design development in speed reducers by the Crichton Company permits directly attaching a small gear reducer to a larger one. This allows the large unit sufficient capacity to carry the heavy output shock loads, while the input reducer is designed for the high speed to balance the overall design. With this arrangement, a reduction gear can have the same output capacity as it has input capacity.

Crichton also announces the production of four larger units, extending the range to 18,219 hp. at 1,600 r.p.m. with a 3.5:1 reduction. **(63)**

● A new, low-cost utility scraper has been announced by the Seaman-Gunnison Corporation. Capacity is 4½ cu. yd. struck, and 6 cu. yd. heaped.

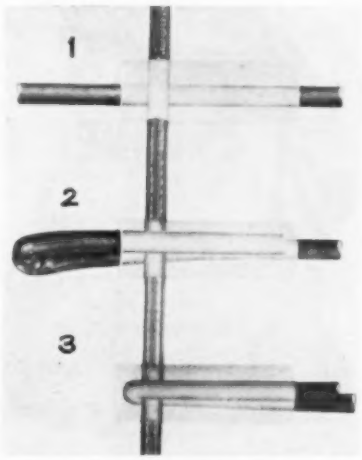
The self-loading Seaman-Gunnison scraper is powered by an International 650 diesel tractor modified as an 88 hp., two-wheel prime mover. All steering and scraper controls are hydraulic. Five speeds range from 2.4 to 21 m.p.h. Maximum cutting depth is 4 in. and spread is from 2 to 14 in. The utility scraper cuts a 7 ft. width. Weight without load is approximately 16,000 lb. **(64)**



● Oliver's expanded line for 1958 includes an improved OC-126 loader which features low profile design and low center of gravity.

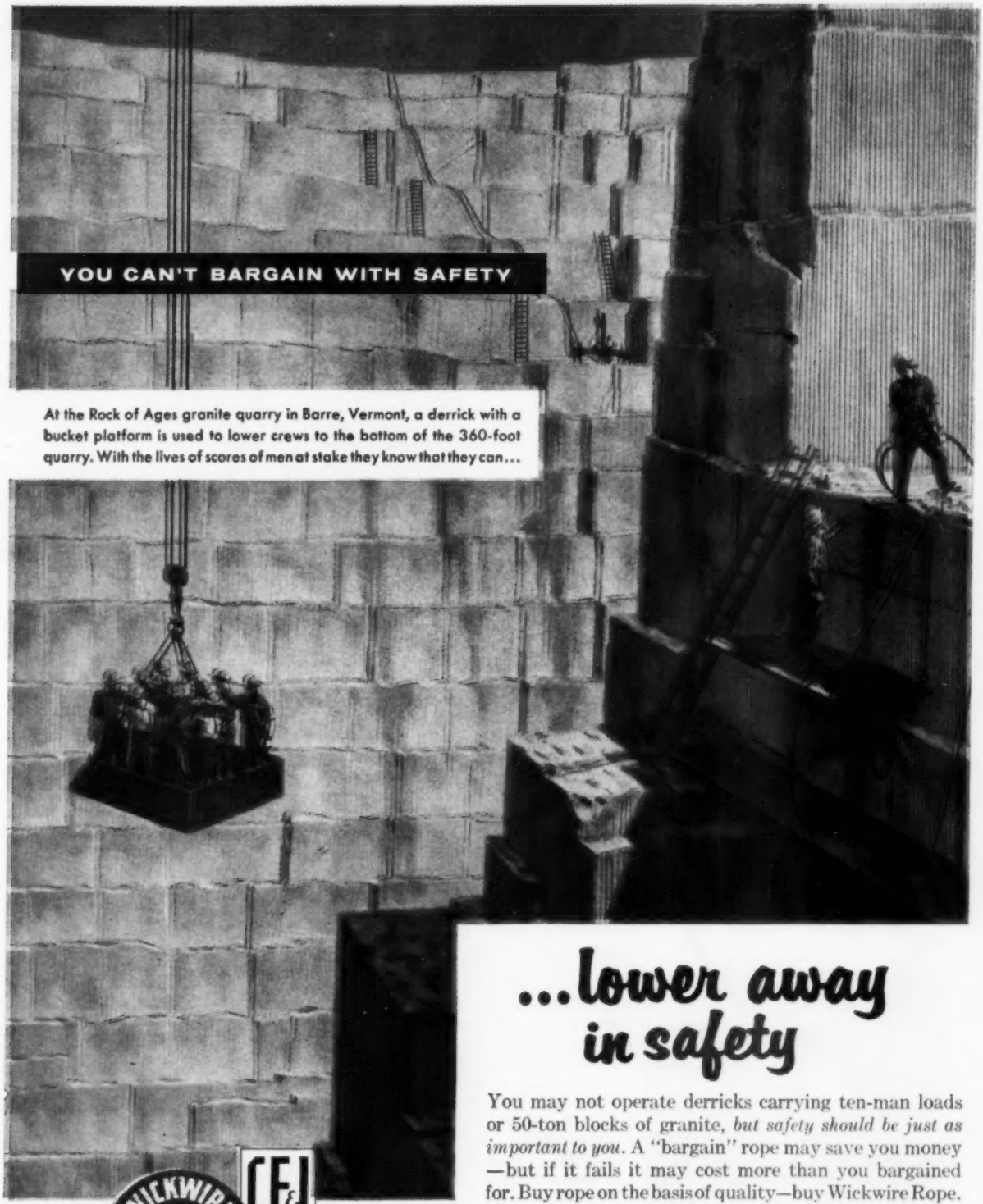
The heavy frame of the OC-126 is rigidly mounted for extra loader strength. Track frames are fixed stationary to the main frame. Full length steel guards protect the five lower track wheels and track assembly by keeping out stones and gravel. Oliver Power-Turn gives the loader two-track power at all times.

An angle blade and lifting boom and fork attachments have been introduced for mounting on the OC-126. **(65)**



● A plastic connector, said to provide a simple but effective method of hooking up detonating fuse preparatory to blasting, has been announced by the Austin Powder Company. When used for joining trunk and branch lines, the new connector is reported to assure a positive coupling that will not slip, loosen, or lose contact under any condition.

The detonating fuse is fastened in the connector in a three-step operation. First, the fuse from the shot hole is threaded through the length of the connector. Then, the truck line is pressed into the grooved slots. Finally, the branch line is passed over the truck line, returned the length of the connector, and pulled tight **(66)**



At the Rock of Ages granite quarry in Barre, Vermont, a derrick with a bucket platform is used to lower crews to the bottom of the 360-foot quarry. With the lives of scores of men at stake they know that they can...

...lower away in safety

You may not operate derricks carrying ten-man loads or 50-ton blocks of granite, *but safety should be just as important to you.* A "bargain" rope may save you money —but if it fails it may cost more than you bargained for. Buy rope on the basis of quality—buy Wickwire Rope.

CF&I

WICKWIRE ROPE — A CF&I PRODUCT

LOOK FOR THE **YELLOW** *TRIANGLE*

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N.M.) • Fort Worth • Houston • Kansas City • Lincoln (Neb.) • Odessa (Tex.) • Oklahoma City • Phoenix • Pueblo Salt Lake City • Tulsa • Wichita • **PACIFIC COAST DIVISION**—Los Angeles • Oakland • Portland • San Francisco • San Leandro Seattle • Spokane • **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) New Orleans • New York • Philadelphia

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Before we built this bin we had to know...

1. The characteristics of the material.
2. The method of loading.
3. The method of discharge.

Over a long period of years, we here at Neff and Fry have learned that a strong bin is only part of the storage problem.

While we do not sell machinery, nor are we affiliated with any machinery manufacturers, we can be of great help to you in suggesting loading and unloading systems.

On your next storage bin, call us in on the early stages of planning. You will have a better bin.

N & F

The difference is in the shape of the STAVE!

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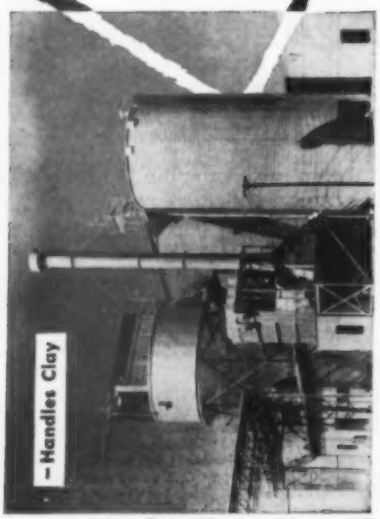
– Handles Clay



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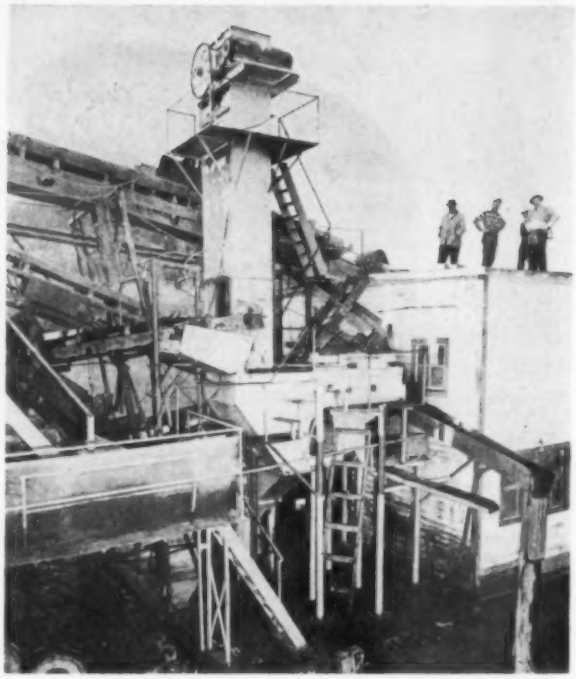


Gravel is delivered to washer via belt conveyor. Cleaned gravel is discharged into a bucket elevator (center rear). Trash is sluiced back into river by trough at right.

● The Fuel Process Company, in co-operation with the Ohio River Sand & Gravel Company and the Tri-State Materials Corporation, recently developed a new machine for washing trash, coal, and other extraneous materials from gravel.

The gravel washer is a special adaptation of the Fuel Process Company's heavy-media type coal washer. In most cases, especially in river dredging, an uprising current of water is employed to float the extraneous materials out of the gravel. The current is created by a circulator built into the washer in such a manner so as to be able to deliver a large volume of water under a very low static head. About 5 hp. is used to drive each circulator.

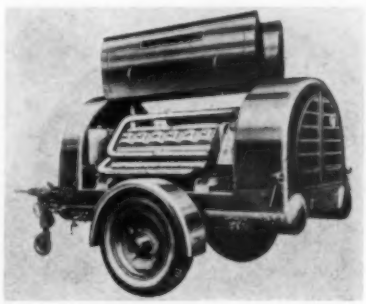
The gravel, being heavier, falls to the bottom of the vessel and is withdrawn as a cleaned product by a bucket elevator. The trash flows over a vibrating screen and is de-watered before being returned to the river. The water is returned through the vibrating screen into the circulating compartment, and is recirculated through the washer. About 20 g.p.m. of make-up water is required to replace the water which is used to sluice the trash away from the washer to disposal in the river.

Less than 20 hp. is required to operate the 100- to 150-t.p.h. capacity washer and the make-up water supply.

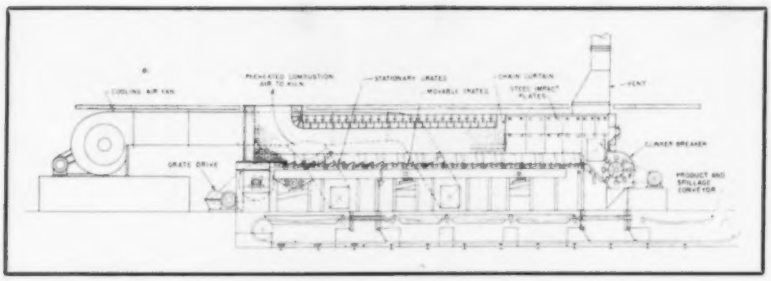
The space required for the 100- to 150-t.p.h. capacity unit is approximately 4 ft. 6 in. wide by 10 ft. 6 in. long by 6 ft. high. Conveying to and from the washer may be done with standard units. **(67)**

● Air Compressors, Inc., introduces a newly-designed diesel-driven compressor of West German manufacture. The self contained unit is available in five models ranging from 55 to 320 c.f.m.

The design eliminates the bulk of the air receivers from the length of



the compressor, making a lighter, shorter unit. Other design features include direct electric starting; non-burning compressor exhaust valves; minimum wearing parts in combined engine and compressor; safety blow-out disc in air receiver, in addition to spring loaded safety valve; provision for self-contained night lighting of sites; provision for throttle control of fixed loads below maximum output. **(68)**



● A newly-developed horizontal-grate cooler has been introduced by the Fuller Company. Designed to cool materials discharged from rotary kilns, sintering machines, and various types of furnaces, this new unit can be used for materials ranging in size from fine foundry sand to clinkers and pellets.

As in an inclined-grate cooler, movable and stationary grates alternate. But with the grates on a horizontal plane, material is pushed by the movable grates up and over the noses of the stationary ones. Resistance of the material against this movement causes immediate horizontal spread across the cooler bed, thereby permitting use of a shorter, more compact cooler.

Cooling air from the air chamber is forced through the horizontal spaces between the grates, and through the vertical openings in each grate.

Constant motion of the movable grates continuously changes the position of the material as it is tumbled from grate to grate, thus exposing all surfaces of material to the flow of air and giving faster cooling. **(69)**

● The W-9 Terraload'r, a four-wheel drive, rear-wheel steer tractor-loader in the 1¾ cu. yd. class, is the

first in a new series to be offered by the J. I. Case Company.

Three interchangeable buckets are available for the W-9—a 1⅜ cu. yd. (heaped) heavy-duty digging bucket; a 1¾ cu. yd. standard material bucket; and a 2¾ cu. yd. light material bucket.

Features of the W-9 include rigid lift-arms pivoted forward of the operator's seat, improved stability, power shift and steer, Torqmatic drive, speeds to 21 m.p.h. in both forward and reverse, and controls and color-coded instruments which are designed for easier, faster operation.

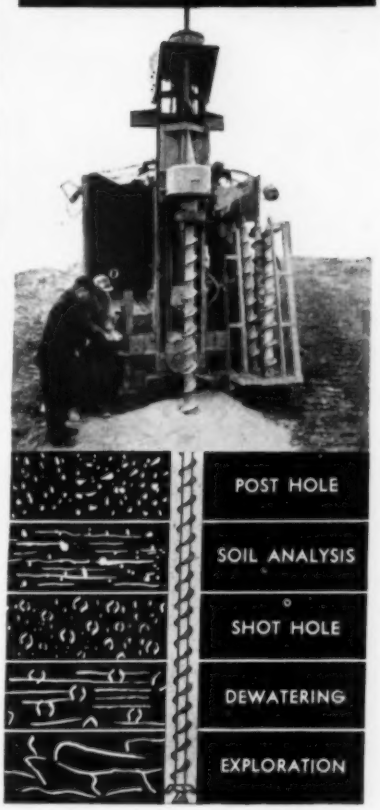
Overall length of the W-9 is 18 ft. 5 in., with bucket at carry. It is powered by a 251 cu. in. Case industrial engine, has 11,000 lb. breakout force at ground level, and 5,500-lb. lift capacity. **(70)**

● The Thermoid Company has designed a new, rugged wire braid hose, called Thunderbird, for heavy-duty applications, such as mining and quarrying. Working pressures up to 400 p.s.i. of air and 2,000 p.s.i. of water are specified.

Thunderbird hose features a heavy-duty Neoprene tube, compounded to resist hot or cold oil without flaking or swelling. Its carcass incorporates high tensile steel wire braid to withstand high working pressures and external blows and impacts. The angle of the braid is carefully controlled to maintain flexibility and to prevent expansion or elongation.

This new hose is available in ten sizes from ⅜ in. up to 4 in. where double wire braid is used, and is furnished in lengths up to 50 ft. **(71)**

DEEPER, FASTER
McCARTHY NEW HEAVY-DUTY
VERTICAL AUGER DRILLS



AUGER DIAMETER	DEPTH OF BORE
20" and 24"	16' to 30'
12" and 16"	60' to 70'

for drilling in earth, clay, compacted sand and gravel, and soft shale formations.

3", 4½", 6", 8" and 9" up to 125'

for drilling the above, plus drilling in hard sandstone formations.

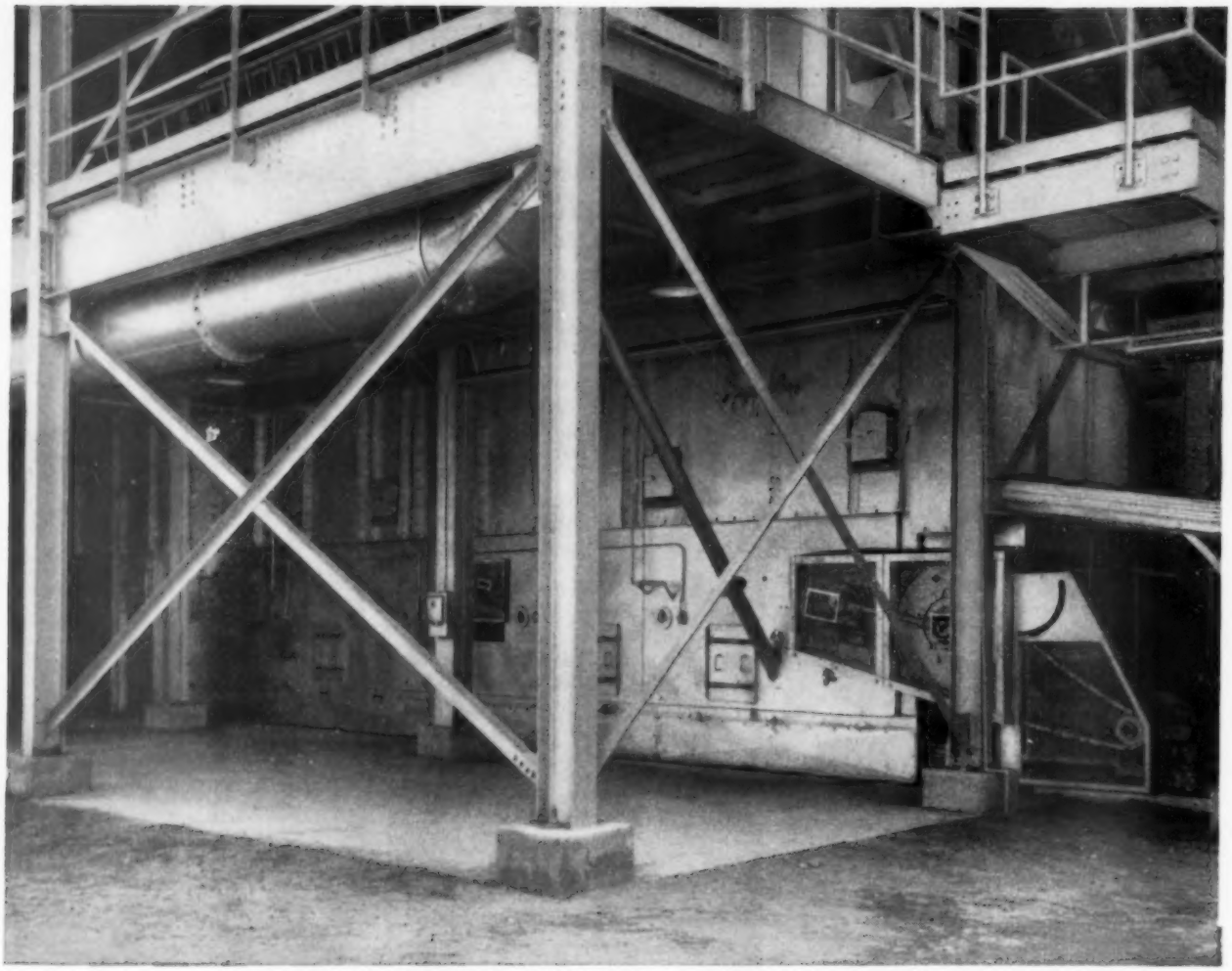
Choose the most desired size auger for each drilling depth, in any vertical drilling operation. The new McCarthy Model 106-24 Vertical Auger Drill handles augers from 3" to 24" in diameter.

Adjust drilling speed properly for various rock and earth formations. Model 106-24 has two output shafts, one speed for earth and one for rock. A gear reducer slows auger rotation for harder rock formations. This gives more torque, or "biting power" in sand rock and soft limestone.

Write for Bulletin M-100

THE SALEM TOOL CO.
1901 SOUTH ELLSWORTH AVE.
SALEM, OHIO, U. S. A.

Enter 57 on card, page 167



Side view from feed end of a 7′ x 44′ horizontal cooler, designed for cooling 4000 barrels of Portland cement clinker per day, showing crank type grate drive.

Announcing...

the FULLER HORIZONTAL-GRATE

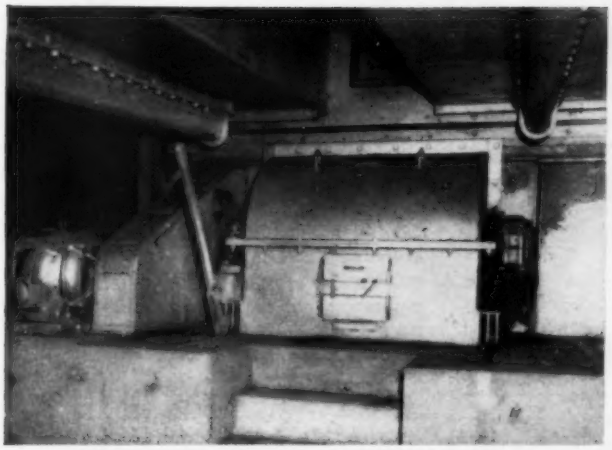
The new Fuller Horizontal-Grate Cooler is a further development and outgrowth of the Fuller Inclined-Grate Cooler, so successfully applied to the cooling of Portland cement clinker and other rotary kiln products in the chemical-process industry, hundreds of which are today in successful operation. Without doubt, this latest development will meet with the same high degree of acceptance and success as its predecessor. Two units are now in operation — twelve more are under construction. Above is a horizontal unit installed in a southern cement plant.

We will, of course, continue to manufacture both types of coolers, enabling us to furnish equipment best suited to meet varying conditions encountered in many plants.

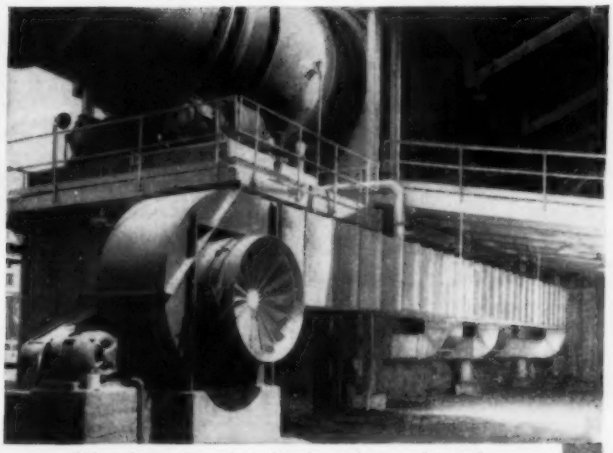
Pertinent features of the Fuller Horizontal-Grate Cooler, are:

Requires a minimum of headroom
Short length if necessary
Improved efficiency of cooling
Better control of secondary air temperature
Increased grate life
Less refractories
Shorter erection time

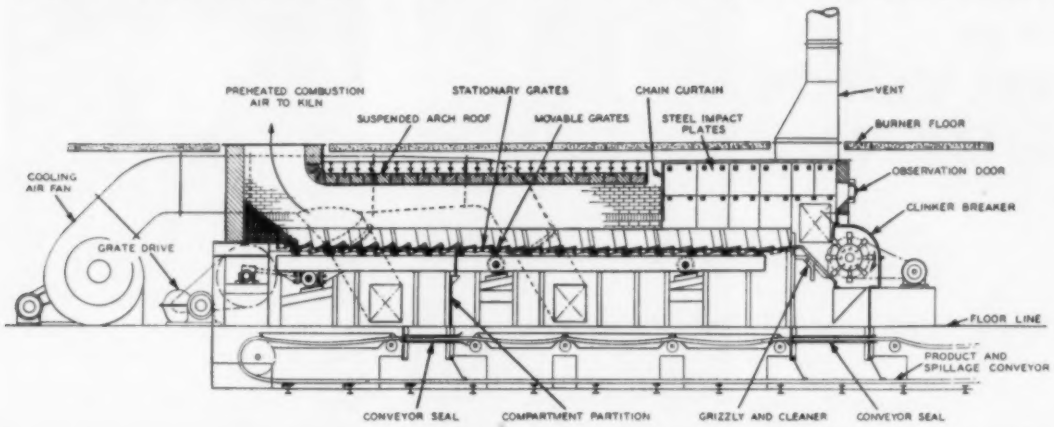
Enter 58 on card, page 167



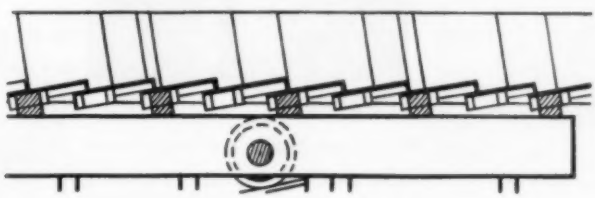
Discharge end of cooler equipped with heavy-duty clinker breaker; vent duct to stack.



Side view of cooler showing air supply and distributing ducts to undergrate air chamber.



COOLER



The improved and more rapid overall distribution of material on the grate of the horizontal cooler permits the use of a short, wide cooler, where length is limited. Improved air diffusion increases the efficiency of the cooler and contributes toward better secondary air temperature control.

Power and air requirements of either cooler are substantially the same.

See Chemical Engineering Catalog for details and specifications.

FULLER COMPANY GENERAL AMERICAN

Fuller

. . . . pioneers in harnessing AIR

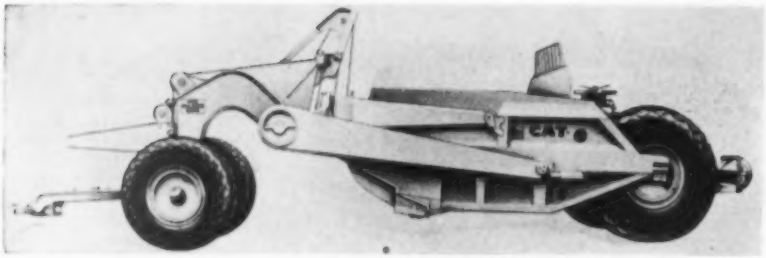
CO-32T
4482

FULLER COMPANY

100 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle



● A new four-wheel scraper in the Caterpillar line is the No. 435 "Low-bowl," replacing the No. 70 scraper for use with the Caterpillar D7 tractor. The new scraper is lower and wider and has 6.7 sq. ft. more of bottom area than its predecessor model, and handles a 27 percent larger load. Its struck capacity is 13 cu. yd., and because its additional width gives it a broader base for heap loading, it can transport 18 cu. yd. of heaped material. Other improved features are an injector of increased height and greater apron opening to assure thorough ejection; also rock guards as protection against fouling of the draft arms by rock spillage over the scraper sides. The No. 435 scraper is large enough to be used economically with the Caterpillar D8 tractor, and can also be used with the D6 tractor. **(72)**

BELT FAILURES?
Switch to
NEW YORK RUBBER!

New York Rubber, famous since 1851, manufactures belt designed to meet trouble—and overcome it! Built for the most severe service demands, there's a New York Rubber belt designed to solve *your* problem. Mineral mining, quarrying, coal mining—these activities often require a belt that will show superior resistance to sharp and abrasive materials, frequently in the presence of oil and grease conditions. Fire, too, takes its toll of conventional belts.

That's why it will pay you to investigate New York Rubber. A brief description of four of our most popular belts follows. Write on your letterhead for more complete details on these and other superior New York Rubber Belts.

REDUCE FAILURES
with these New York Rubber belts:

STONORE—Highest quality, for most severe service. Handles heavy ores, trap rock, crushed stone, coarse broken glass, slag, cement clinkers, direct feed from digging and mining machinery. Mildew-proof.

DEPENDABLE—For handling coal both under and above ground, sand and gravel, trap rock, sulphur, lime and limestone. Ideal for sub-zero temperatures. Mildew-proof.

NEOPRENE—Resists oil and grease conditions adverse to natural rubber. Handles caustics and coal briquettes. Heat-resistant to 250°F. Mildew-proof.

TEMP-PRENE*—A neoprene compounded for fire resistance and severe, rough surfaces. Mildew-proof.

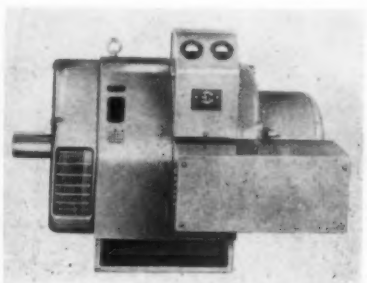
*Acceptance designation: "Fire Resistant, U.S.B.M. No. 28-11".

NY RUBBER

NEW YORK RUBBER
CORPORATION
Established 1851
100 PARK AVENUE • NEW YORK 17, NEW YORK

Enter 60 on card, page 167

● Ironton AL-70 (70 percent alumina brick), a refractory brick manufactured by The Ironton Fire Brick Company, has an extra high density to give greater resistance to abrasion and chemical attack. These units quickly acquire a good coating which adheres tightly. **(73)**



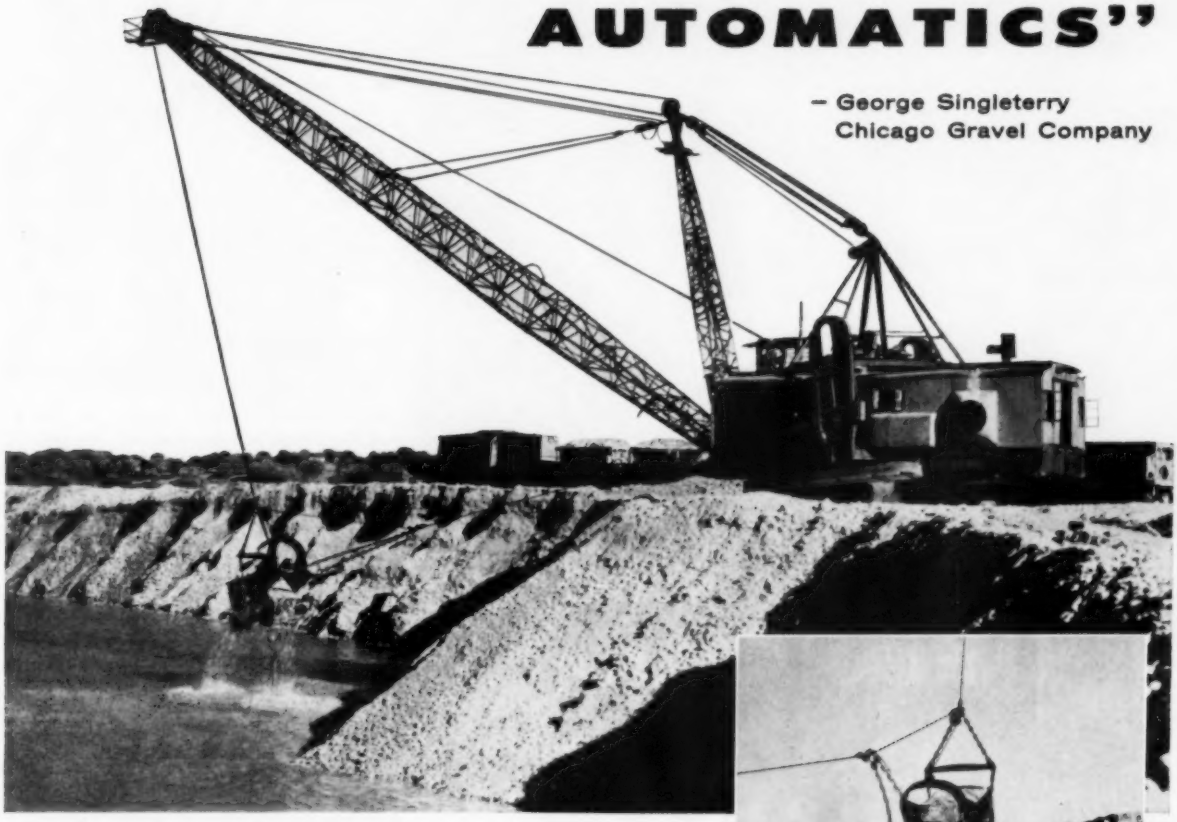
● Electric Machinery Mfg. Company has developed a new generator which features a static exciter and a voltage regulator with no moving parts.

The regulator is of the magnetic amplifier type. The extremely fast voltage regulating ability of this type of regulator permits the generator to start larger motors.

The generators, designated "Amp-Pak," are available in ratings from 50 to 150 kw. **(74)**

"we need PRODUCTION...
ALL *our buckets are*
PAGE
AUTOMATICS"

– George Singleterry
Chicago Gravel Company



**OPERATOR DIGS UNDER 35 FT. WATER...
TAKES OUT FULL RATED LOAD EACH CYCLE**

Here's why Page Automatics are the preferred bucket at Chicago Gravel Company, one of Northern Illinois' largest producers.

This Page Model 618 Dragline, equipped with a 5 yd. Page Automatic Bucket, is loading 33 yd. capacity cars (inset) at an average rate of one car per 5 minutes. The Bucket is digging 35 ft. below the water's surface and comes up with a full load in less than 2 lengths of the bucket. That's *digging* that means *production!*

There's no substitute for digging ability in a Dragline bucket. Your investment in a machine is too big to settle for less than the best digging bucket you can buy. And when it comes to digging, no bucket will equal a Page Automatic – the bucket that's built to dig faster, and carry out more on every cycle. *Write for Catalog A57.*

PAGE ENGINEERING CO.
Clearing Post Office, Chicago 38, Ill.

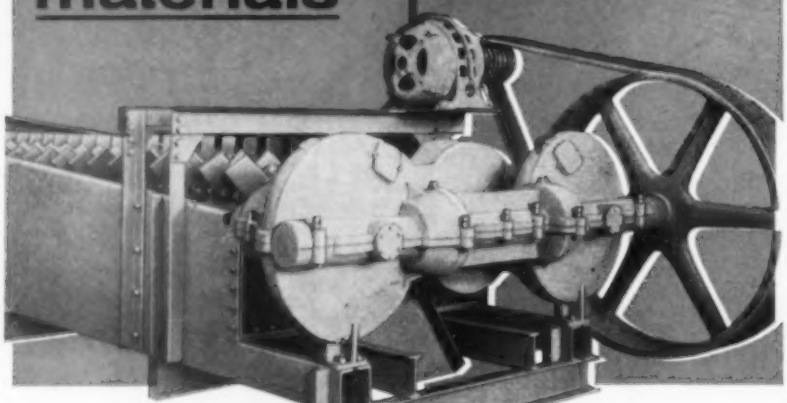
Page
Automatic Dragline Buckets
Walking Draglines

If it's a PAGE... *It* DIGS

B3111

High Capacities of clean materials

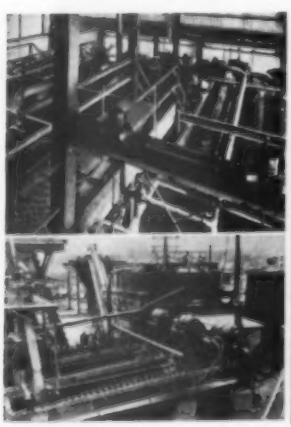
Developed from the world's first all-steel log washers built by McLanahan & Stone in 1894, these machines produce high tonnages of exceptionally clean materials—removing tough clay, soft rock and refuse with unequalled speed and economy. Available in Heavy-Duty and Mudmaster styles. *Write for Bulletins WLO-1155 and MM-755.*

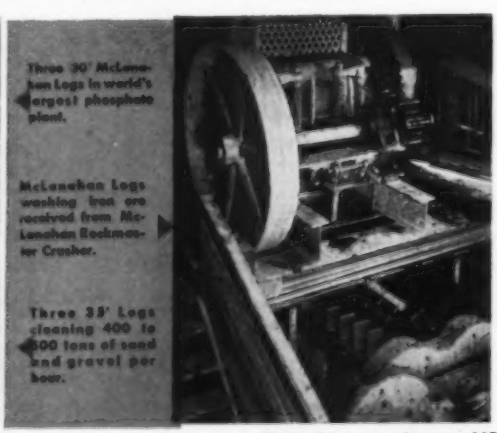


McLANAHAN SINCE 1835

LOG WASHERS

McLANAHAN & STONE CORPORATION
253 Wall Street, Hollidaysburg, Pennsylvania




Three 30' McLanahan Logs in world's largest phosphate plant.
McLanahan Logs washing iron ore received from McLanahan Rockmaster Crusher.
Three 35' Logs cleaning 400 to 500 tons of sand and gravel per hour.

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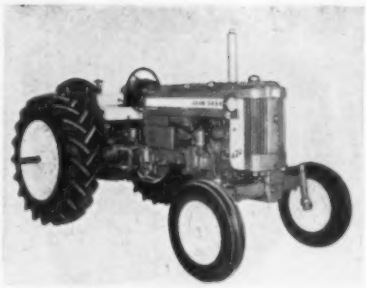


● A new wheel-type utility tractor, called the "420" Special Utility (420-I), has been developed by John Deere. The unit handles a variety of front- and rear-mounted working equipment, including loaders and backhoes. The three-point hitch takes standard three-point-hitch tools.

The new tractor delivers approximately 30 engine horsepower and is designed for extra all-around stability under load. Regular equipment includes adjustable rear wheels and Dual Touch-o-matic hydraulic control. Optional equipment includes power steering, speed - hour meter, foot throttle, direction reverser, precleaner, remote hydraulic system, and five-speed transmission. **(75)**

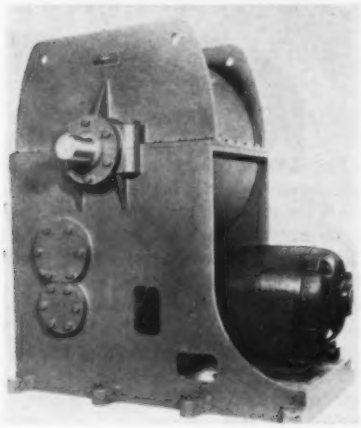
● Reich Brothers Manufacturing Company, Inc., announces the Reich T-750 combination rotary and "down-the-hole" drilling machine.

In rotary drilling, the T-750 can exert almost 40,000 lb. on the bit. Infinitely variable rotation provides the right speed for the material being drilled. In down-the-hole drilling, sensitive controls enable the operator to apply exactly the right amount of pressure and rotation speed for maximum penetration by the hammer and bits.

Other features of the T-750 include heavy-duty jacks, semi-automatic stem handling, and a minimum of control levers placed conveniently at the operator's station. **(76)**

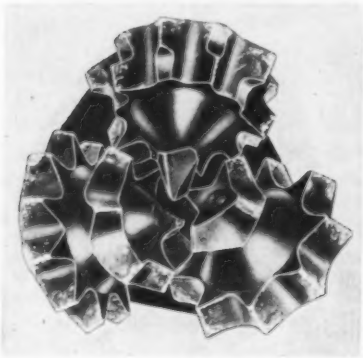
● The H. W. North Company recently introduced its new line of heavy-duty speed reducers and load supporting type flexible couplings.

Designed for driving all types of heavy rotating machinery at low and medium speeds, both parallel shaft and right angle type units are being



offered for severe service applications in A. G. M. A. ratings up to 1,500 hp.

These new Unicentric drives are now available in single and multiple reduction models representing a wide range of standard ratios and output speeds. **(77)**



● Oil Tool Manufacturing Company announces its new K-4 drill bit. The tooth design delivers maximum penetration in low compressive strength strata, such as soft shales, broken shale, and soft limestone.

The cones are offset 6 deg. from the apex to give a tearing, twisting, gouging action without heavy weights. The K-4 is recommended at weights ranging from 1,000 to 3,000 p.s.i. bit diameter, and rotary speeds from 75 to 150 r.p.m. It is available in 4¼-in., 4½-in., 4¾-in., 7⅛-in. and 7⅜-in. sizes. **(78)**

Drier, Cleaner Finished Product

. . . HEAVIER CONSTRUCTION

Heavier constructed throughout, these units are designed to exceed the service life of competitive washers, while assuring low-cost removal of waste and water. Among significant design features are: (1) grease-lubricated, anti-friction bearings, sealed against water and sand, (2) simplified drive, (3) sufficient rigidity to be set anywhere without supports under center of box. *Write for Bulletin SW-953.*

McLANAHAN SINCE 1835

SCREW WASHERS

McLANAHAN & STONE CORPORATION

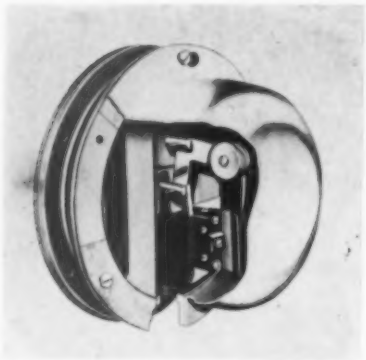
253 Wall Street, Hollidaysburg, Pennsylvania

McLanahan Single Screw Washer.

(Far left) Single Screw Washer dewatering concrete sand.

Cleaning and classifying coarse and fine sands with McLanahan Screw Washers.

Enter 63 on card, page 167



● Several design changes in the Bin-Dicator, an automatic bin level indicator and control unit manufactured by The Bin-Dicator Company, provide more efficient operation.

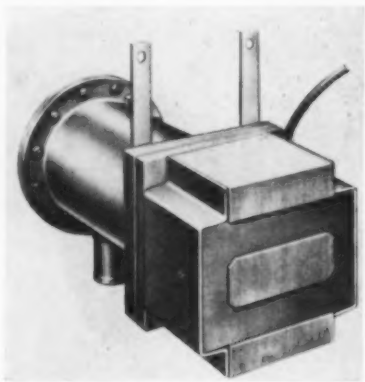
A new twist lock cover, particularly helpful on units which are to be installed in hard-to-reach locations, incorporates slotted hex head screws which loosen so that the cover can be turned and lifted, exposing the entire operating mechanism.

Another improvement in the Bin-Dicator is a vented housing, which relieves pressure build-up in the housing as the diaphragm is flexed in response to the pressure of the material building up.

Other new construction features include a drilled and tapped frame for assembly of cover, drilled and tapped frame for assembly of diaphragm and diaphragm retainer ring, and a diaphragm assembly which has perforated mounting holes to simplify replacement or change of diaphragm. **(79)**

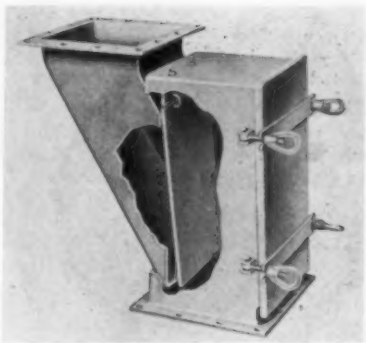
● Syntron Company has announced its new "Fluid-Power" car rappers with magnetic holders to speed the unloading of bottom-dump mine cars. Operated on oil pressure from a closed circuit pumping system, the rappers deliver 300 sharp, powerful jolts per minute.

The units, used in pairs, are easily installed in tipple or car dump, suspended by cables positioned so that the magnetic holding devices clear



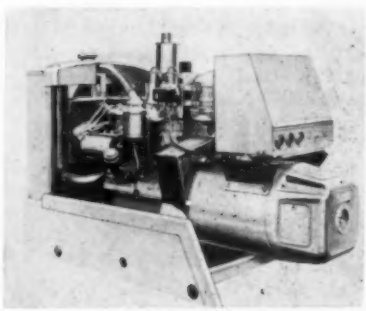
the trip. After the car gates are opened, the switch is closed. The magnetic holders swing in and clamp to the car and the rappers start pounding. When the car is emptied, the switch is opened, and the holding devices release and swing back out of the way, ready for another trip.

Complete outfit includes two rappers with magnetic holders and the closed circuit fluid pressure pumping system. **(80)**



● The Ducon Company, Inc., has introduced its Type FA trickle valve, which provides continuous discharge of dust from dry dust collectors, while maintaining a positive gas seal. The new trickle valve is suitable for all free flowing materials with a specific gravity of 2 or higher. It is applicable for negative pressures up to 12 in. water gauge.

A front access door to all internal parts facilitates inspection and observation. **(82)**

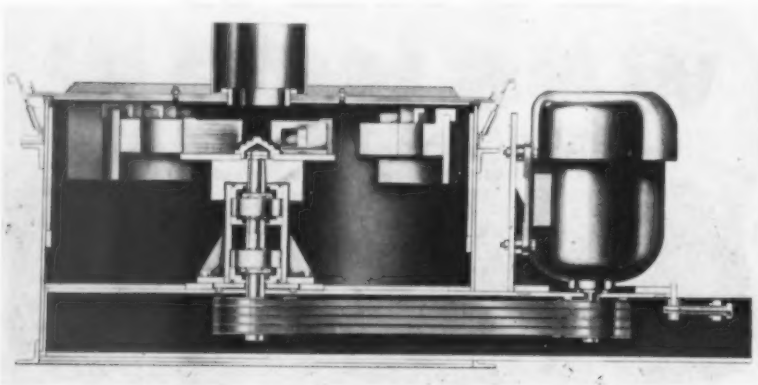


● D. W. Onan & Sons Inc. has available a new HC Series of water-cooled, revolving-armature 10 and 15 kw. electric plants.

Available in either 10,000 or 15,000 watt a.c. size ranges in voltages to 460 v., these gasoline-driven units will provide full-rated electric power for all types of standby emergency applications, wherever there is need for quick-starting auxiliary power in this capacity.

Prime mover for these new Onan electric plants is the heavy-duty, 41-hp. Continental F-162 engine. Direct-connected to an Onan all-climate generator, this 4-cylinder, water-cooled engine operates on either gasoline or gaseous fuel.

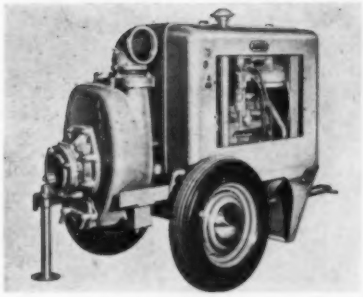
Rated for continuous heavy-duty service, the Onan self-aligning generator has a generous overload capacity. It provides voltage regulation of plus or minus 5 percent, with frequency regulation of 3 cycles maximum. **(83)**



● Werco's Tornado impact crusher is available in 3 ft. and 4½ ft. single-stage units and in a 3 ft. two-stage unit, with capacities ranging from 30 to 50 t.p.h.

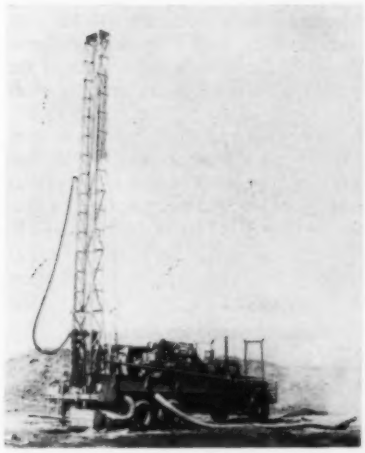
Designed for the reduction of dry, wet, or damp materials, the Tornado is based on the principle of central impeller shoes spinning to hurl particles of gravel against breaker plates at tremendous speed. The impact "explodes" the rock, causing it to cleave across the grain as well as with the grain.

The unit, only 3½ ft. high, requires little headroom, and can be mounted on top of a bin without a massive foundation. **(81)**



● Jaeger Machine Company's Model 6HP can pump 1,050 g.p.m. at 60 lb. for pressure service, or 100,000 g.p.h. at 10 ft. suction lift as a dewatering pump.

The Jaeger 6HP self-primes rapidly and holds prime indefinitely. The replaceable liner plate is adjustable for wear. The shaft is in a high capacity ball bearing and has the Jaeger Lubri-Seal, which is positively lubricated for long life and is accessible for inspection without dismantling the pump. **(84)**



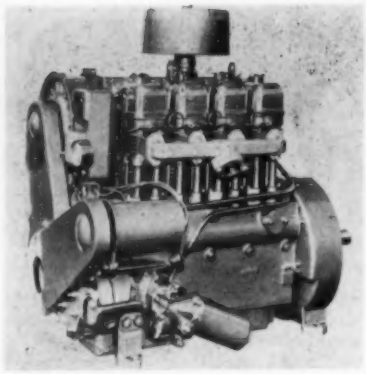
● Gardner-Denver offers two models of its new percussion-type Mole-Dril for blast holes—the Model AM-4, which uses a 4¾ in. bit, and the Model AM-6, which uses a 6½ in. bit.

When hard formations are encountered, the Mole-Dril may be attached to the drill stem in place of the rotary bit. The drill stem conducts the compressed air supply to and rotates the drill. A tungsten carbide insert bit is attached to the tappet, becoming an integral part of the drill, and providing the Mole-Dril maximum drilling efficiency.

A direct air stream, at full line pressure, is directed through the bit to keep the hole face clean. Exhaust air from the drill is directed upward through ports midway up the drill, blowing cuttings up the hole **(85)**

● This four-cylinder, air-cooled, high-speed engine is one of four new lightweight diesel engines now being introduced to the American market by Brush Aboe, Inc., U. S. affiliate of Petters Limited, Staines, England.

Petter's new PC series includes one-, two-, and four-cylinder models ranging in weight from 243 lb. for the single-cylinder PC-1 to 503 lb. for the four-cylinder PC-4. Horsepower output ranges from 6.25 for the PC-1 to 25 for the PC-4. All Petters PC engines operate at a constant speed of 3,000 r.p.m. **(86)**

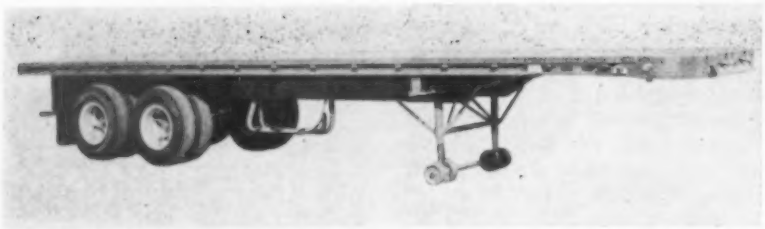


Proof of Performance

The kiln illustrated is equipped with the Type F Recuperator. It presents conclusive proof of claims made for Recuperator performance, namely, rapid air quenching and cooling with immediate ignition of the fuel-air mixture at the tip of the burner pipe. It will also be observed that visibility inside the kiln is exceptional.

MANITOWOC SHIPBUILDING, INC.
MANITOWOC, WIS.

Enter 65 on card, page 167



● Widely used for on- and off-the-highway hauling of equipment, Model PX platform semi-trailers, manufactured by Transport Trailers, Inc., are especially designed to meet load carrying requirements with maximum payload capacity. They feature full-length electrically welded wide-flange main beams and extra deep outer rail frame construction.

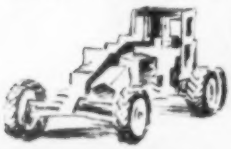
Heavy-duty progressive spring mounted tandem assemblies with full width tubular cambered axles provide equal load distribution to wheels in any position. Floors are decked with tongue and groove structural grade flooring. **(87)**

● The Heil Company is producing a series of high capacity rock bodies (approximately 36 cu. yd. heaped) fabricated entirely from special aluminum alloy and extruded sections. These bodies are being mounted on special off-the-highway trucks, with Heil heavy-duty telescopic hoists.

According to the manufacturer, the aluminum plate bodies increase payload capacity, reduce tire wear and gasoline consumption, and increase speed. Other features are all-welded construction, and rounded interior corners to prevent adhesion of stock materials. **(88)**

● In a new application, Coroline corrosion-proof thermo-setting material, a recent development of The Ceilcote Company, Inc., was used to cover housing and fan blades of this corrosive atmosphere expulsion fan. The coating provided the exhaust unit with a tough, abrasion-resistant surface, greatly extending its working life in the handling of fumes and vapors. **(89)**

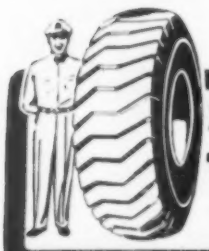
Get exactly the tread design your job requires at SOUTHERN TIRE



At your service—the world's most complete range of tire sizes and tread designs in one shop—now at Southern Tire Company!

Whether you operate light or heavy equipment, Southern Tire can supply the tread design and size you need —and save you money at the same time. Superior equipment, including the greatest range of tire sizes and tread designs in the country, and the world's largest and finest three-sectional retreading mold, enables Southern Tire to retread any tire, regardless of growth, without buffing to the breaker strips. This, plus Southern Tire's long experience and use of finest tread rubber, assures you of guaranteed new tire service—and the tread design you need—at less than half new tire cost.

All special service tire sizes from 1100 x 24 to 33.5 x 33
Call your favorite dealer and specify Southern Tire retreads



SOUTHERN TIRE COMPANY
1414 Broadway
SHEFFIELD, ALA.
Phone Collect
EV 3-2312

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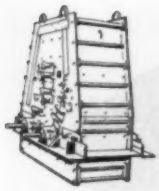
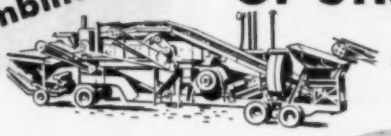
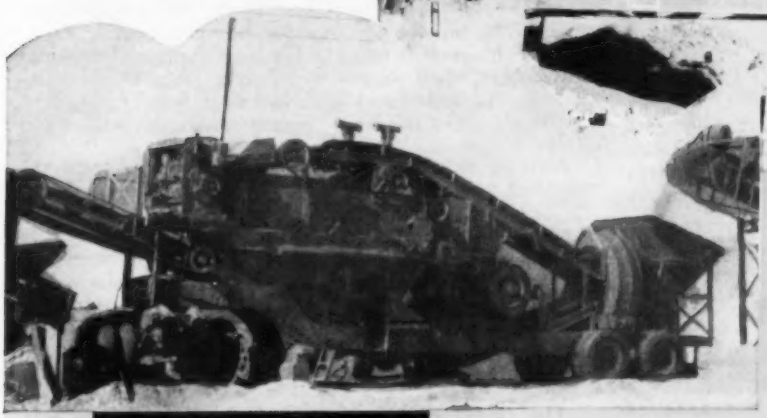


Cedarapids Skid-Mounted Primary Portable Secondary Combination . . . PRODUCES BIG VOLUMES OF STRICT-SPECIFICATION AGGREGATE



Cedarapids "Packaged" skid-mounted stationary 3645 Double Impeller Impact Breaker produces a high percent of required smaller sizes in the primary reduction operation. Cedarapids 36" x 14' Feeder feeds quarry rock onto a single deck 40" x 6' Vibrating Grizzly to by-pass fines around the Impact Breaker.



Material from the Double Impeller is conveyed to a surge pile and is then fed into this Cedarapids Portable 4033 Hammermill Secondary Plant. Oversize from the top screen deck goes through the hammermill for secondary reduction, while material passing the ¾" bottom screen deck is delivered directly to the Cedarapids screen-bin unit.

MAXIMUM PRODUCTION OF SPECIFIED SIZES

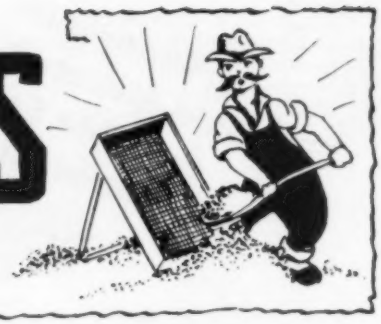
¾" to ⅜" MATERIAL		
Size	Minimum	Maximum
1"	100	
¾"	95	100
½"	50	90
⅜"	10	40
No. 4	1	10
No. 8	1	6
No. 30	1	6
No. 50	1	6
No. 100	1	5
No. 200	1	4

LIMITS—⅜" Chip Material		
Size	Minimum	Maximum
⅜"	100	
No. 4	60	80
No. 8	40	55
No. 30	17	28
No. 50	17	25
No. 100	15	22
No. 200	11	17

The combination of a Cedarapids 3645 Double Impeller Impact Breaker and a Cedarapids Portable Hammermill Secondary used by Beu & Sons Co. of LaPorte City, Iowa, is producing 70% of ⅜" minus and 30% of ¾" material at an average 220 ton per hour production rate . . . and as high as 5800 tons of 1¼" in 18 hours . . . with a high crushing percentage. Look at the screen-analysis table on this plant's production. This type of operation proves the versatility and productivity of Cedarapids equipment for turning out strict-specification aggregate in the tonnages demanded.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

SCREENINGS



By RAY L. SMITH JR.

IN ONE WAY at least, January is the best month of the year. There is something about starting with a new calendar that encourages an inventory of old mistakes to be avoided; the planning of new ways for progress; the setting up of specific goals by which achievements can be measured. We hope improvement has been made a part of your program.

At this point we start thinking, "So much to do and so little time." Actually there's quite a bit of time, but according to the chart reproduced below, there are not many people left to do it.

1957 BALANCE SHEET	
Population of the United States	160,000,000
People 65 years or older	49,000,000
Balance left to do the work	111,000,000
People 21 years or younger	56,000,000
Balance left to do the work	55,000,000
People working for the government	29,000,000
Balance left to do the work	26,000,000
People in the Armed Services	11,000,000
Balance left to do the work	15,000,000
People in state or city offices	12,800,000
Balance left to do the work	2,200,000
Bums and others who don't work	2,000,000
Balance left to do the work	200,000
People in hospitals or asylums	126,000
Balance left to do the work	74,000
Persons in jail	73,998
Balance left to do the work	2

TWO?! Why, that's you and me?

Then you'd better get to work, because we're awfully tired of running this country alone!

Present Indicative

STRANGE as it may seem, women have become easier to please, down through the centuries. Nowadays, such practical presents as Remington Rand adding machines or electric shavers are acceptable, but at one time women longed for more romantic things.

Richard Wagner's wife, Cosima, was awakened on Christmas morning, 1870, by a string ensemble playing the Siegfried Idyll—written for her. Emperor Napoleon I gave the wife of his stepson, Eugene de Beauharnais, a solid gold tea service, now on display at the Metropolitan Museum in New York City.

An even more lavish offering was the 199 carat diamond presented to Catherine the Great of Russia by Count Grigori Orloff and later mounted in the imperial sceptre, where it remains today—in the Kremlin.

Potpourri And Succotash

An ardent fisherman, early one cold morning, described a wonderful dream he'd had to a fellow angler.

"I dreamed I was out on Lake Arrowhead with Jayne Mansfield," he said, "and I was just about to propose to her."

"What a dream!" said the other. "How'd it turn out?"

"Just wonderful—I caught an eight-pound bass."

Which reminds us of the little television addict who had been naughty all day and was finally sent to bed without his supper. What was even more to the point, he was deprived of his beloved television for the whole evening.

Later, his mother brought him some milk and cookies. "Now, dear, when you say your prayers tonight," she said, "ask God to make you a good boy tomorrow."

"Why?" asked the boy. "What's on Tomorrow?"

Arriving at a small western town, an easterner was attempting to start up a friendly conversation with a native.

"Tell me," he said, "what is the status of the liquor supply around here?"

"Status?" mumbled the native.

"I mean, is it easy to obtain liquor and is there much of it around here?"

"Well, mister," said the man, "all I can tell you is that a little way back they turned off the water supply for a week and nobody knew it till the town hall caught fire."

The (lady) customer at the dress goods counter was about to exhaust the patience of the clerk waiting on her, as she examined bolt after bolt of material, also attracting attention from everybody in a radius of fifty feet.

Finally, while she was feverishly unwinding a bolt of satin, an exasperated floorwalker sauntered up and asked smoothly:

"Pardon me, madam, but may I ask if you are shopping?"

"Certainly I am!" snapped the lady. "Whadja think I was doin'?"

The floorwalker was courteous.

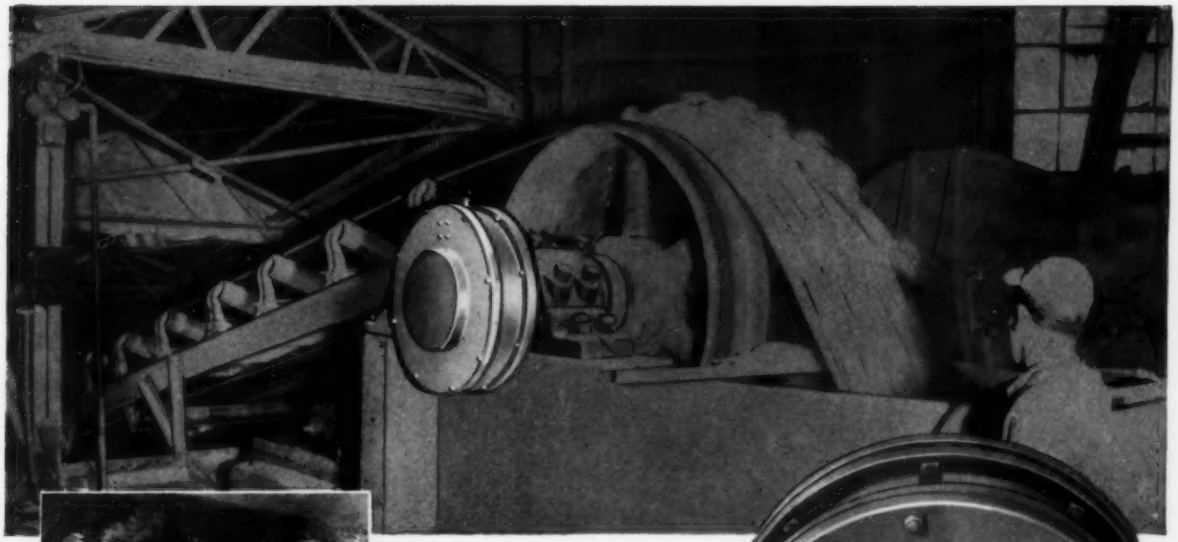
"Well, frankly, madam, I had begun to form the impression that you were taking inventory."

A garden club in Illinois announced the forthcoming visit of a celebrated botanist:

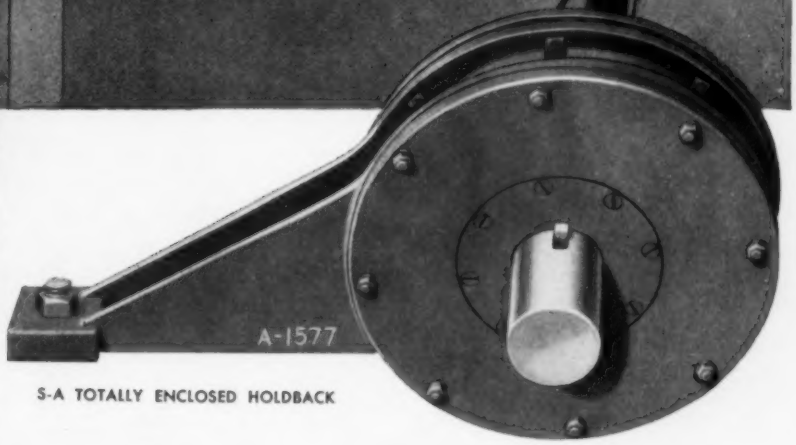
"He will discuss trees, and conduct the ladies on a short walk through the park, indentifying them by their shapes and characteristics."

A hitch hiker was picked up by a big expensive car, driven by an obviously wealthy Texan. Seeing a pair of horn-rimmed glasses on the seat between them, the hitch hiker remarked, "Shouldn't you be wearing your glasses while driving, sir?"

"Don't you give it no mind, son," replied the Texan. "It's no trouble drivin' this way. The whole danged windshield is ground to my prescription."

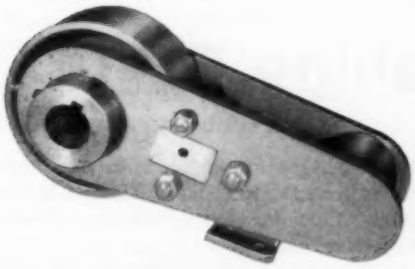


The Belt Conveyor, shown above is 48 inches wide and 1200 feet long. An S-A Totally Enclosed Hold-Back prevents a disastrous reversal of this heavily loaded belt during normal operating delays or in case of a power failure.



S-A TOTALLY ENCLOSED HOLDBACK

Prevent the reversal of conveyors and elevators with STEPHENS-ADAMSON TOTALLY ENCLOSED HOLD-BACKS!



S-A STANDARD ROLLER TYPE HOLD-BACK . . . provides all of the same outstanding advantages with the exception of the Totally Enclosed Design. Ruggedly constructed . . . economical . . . stocked for immediate delivery.

OUTSTANDING ADVANTAGES:

- Engages without shock . . . instantly holds . . . instantly releases when power is resumed.
- Eliminates flooding of feeder points . . . protects men and equipment.
- Balanced design . . . no ratchet to become fouled . . . quickly and easily installed . . . provides years of dependable, trouble-free operation . . . may be installed in any position!
- Totally enclosed design prevents entry of dust and dirt . . . economical to purchase, operate and maintain.
- Available in bore sizes from 1 7/16" to 12" . . . stocked for immediate delivery.

Write today for complete information . . .
Request Catalog No. 557.

STANDARD PRODUCTS DIVISION
STEPHENS-ADAMSON MFG. CO.
20 Ridgeway Ave. Aurora, Illinois

Gen. Sales Office & Main Plant: 20 Ridgeway Av., Aurora, Ill.
Plants at: Clarksdale, Miss., Los Angeles, Calif., Belleville, Ontario, Can.

Enter 69 on card, page 167

High altitudes, narrow benches severely test this Michigan, yet every day it loads

400 tons of rock weighing 5,400 lbs per cubic yard

Up in the scenic Sapphire Mountains of southwestern Montana, Cummings-Roberts Company has one of the toughest rock-loading jobs you could find anywhere.

Part of the time, they blast and load coarse mountain-top granite . . . summer and early fall, they load fluorspar. No one needs to detail what a severe test the heavy, rough granite overburden gives to *any* loader. Fluorspar, however, is even worse. A heavy rock mineral, it weighs 5,400 pounds per cubic yard—over 850 lbs more per yard than in-bank granite (and 2,200 lbs more than pit-run gravel).

Proved by demonstration

Over the years, Cummings-Roberts has tried just about every kind of loader made. Last year to increase efficiency, their Michigan distributor, Miller Machinery Co., Missoula, suggested a Model 175A Michigan Tractor Shovel. "Frankly," Cummings-Roberts officials told them, "we don't believe *any* rubber-tire unit can load the stuff, much less do the work day in and day out. But we'll give it a try."

Result? John Taber, General Superintendent, wouldn't let them take the Michigan off the job.

Heaped loading assures proper blending

Today, the 133 hp 2¾ yard Michigan handles *all* loading of the super-heavy fluorspar. Production, with trucks on 600 ft one-way hauls to crushing mill, averages 400 tons per 7-hour day. The fluorspar, incidentally, varies considerably in grade from place to place through-

Enter 70 on card, page 167

out the mine. It must be blended to give the grade desired for shipment . . . and this assignment goes to the Michigan, too. Its 27 mph mobility is a vital asset on this scattered loading; trucks never wait more than a few minutes for loading service.

Strips granite overburden — 500 tons per day!

In late autumn and sometimes in spring, the Michigan strips the granite overburden. Output averages *500 tons* per 7-hour day.

Downtime negligible

With all this rugged loading of super-heavy material, plus repeated back-and-forth maneuvering on narrow benches, plus continuous work at high 6,800 to 7,000 ft altitudes, the torque converter equipped Michigan has posted an excellent mechanical record. *To date, it has had only one minor breakdown!*

Also tows compressors, speeds other odd jobs

Operator Don Lindblom likes Michigan's powershift transmission, says its bucket action is the best he's ever worked with. "You can tip it back and fill it easily," he says. "I like the fact also that it takes only half-an-hour per day to refuel and lubricate." Foreman Waino Lindblom adds, "The Michigan has done a nice job for us! We particularly like its truck-like speed in moving from bench to bench." This mobility gives the Michigan some "spare time" to handle maintenance jobs scattered along 15 mi of mountain roads—cleaning rock rubble off benches so trucks and wagon drills can get through . . . hauling air compressors . . . digging culverts . . . even plowing snow.

Got a tougher job than this?

There *may* be a tougher materials-handling job than loading granite and fluorspar . . . but we're willing to bet a Michigan Tractor Shovel can do it faster, better, at lower cost than any other machine. To prove it, your Michigan Distributor will be glad to arrange a demonstration at *your* convenience. *You pick the jobs.*

CLARK® EQUIPMENT

Michigan is a registered trade-mark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road
Benton Harbor 33, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

"...does 75% of our loading ...more efficient than any other loader we have used"

The Frank Bushika plant at Cheshire, Mass., produces three sizes of stone plus mason and concrete sand and bank run gravel. Its model HO "PAYLOADER" is used to load trucks with all grades of material, to level stockpiles and do a variety of lugging and maintenance work. Since it came on the job, it has taken over most of the loading from two other makes of loaders.

According to Frank Bushika, Jr., a partner, "the HO 'PAYLOADER' is definitely more efficient than any other loader we have used. It does 75% of our loading work and the other two loaders stand by mostly. The high reach, moveability and speed of the HO to change locations and load from numerous stockpiles are big advantages in our operation."

A 4-wheel-drive "PAYLOADER" will also give *you* more machine for your investment. Its unique bucket action gets and retains bigger loads; power-transfer differentials plus heavy duty axles assure reliable traction on mud, gravel, ice and snow and more digging power; power-shift transmission, power-steering and 4-wheel power brakes are just a few of the features that make them outperform any comparable size of tractor-shovel.

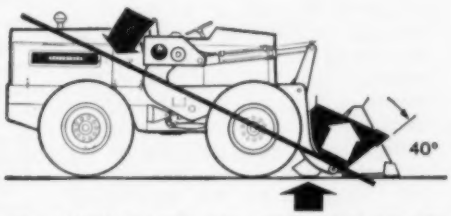
Your nearby Hough Distributor is ready to prove it. Contact him today.

Ask about...

PURCHASE AND HOUGH LEASE PLANS

Now your Hough Distributor has at his disposal the broadest and most complete set of financing plans ever offered:—TIME PAYMENT . . . LEASING PLANS,* with or without OPTION TO PURCHASE—any and all kinds of financing to best fit your needs for the purchase of "PAYLOADER" equipment. See him today.

* *Available in Continental U.S.A.*



40° ROLL-BACK AT GROUND LEVEL produces a tremendous pry-out force by using break-out pads at bottom of lifting arms as ground support or fulcrum . . . keeps bucket close to machine for maximum stability and carry capacity.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
750 Sunnyside Ave., Libertyville, Ill.

Send data on 4-wheel-drive "PAYLOADER" tractor shovels:

- ☐ Model HO (9,000 lb. carry capacity)
- ☐ Model HH (7,000 lb. carry capacity)
- ☐ Model HU (5,000 lb. carry capacity)

NAME_____
TITLE_____
COMPANY_____
STREET_____
CITY_____ STATE_____

1-B-3

Enter 72 on card, page 167

Labor Developments

The Ouster of the Teamsters

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations

Washington, D. C.-Philadelphia, Pa.

NOW THAT the giant International Brotherhood of Teamsters, Chauffeurs, Warehouse Men and Helpers of America has been expelled officially from the A.F.L.-C.I.O., it is important for businessmen to consider what effect this action may have upon them. Even those who do not deal with the Teamsters Union directly may, in many situations, feel the repercussions.

Of first importance is the question: "Will this action start a widespread raiding campaign?" While such raiding campaigns have been harmful to the union participants in the past, they have frequently hurt the innocent by-standing employer even more seriously. It is the employer, his business, and the customers who rely upon him to supply their requirements, who find themselves caught in the cross-fire, often with no place to go for shelter.

It may be possible to gauge the likelihood of such a development from the attitudes of the parties at the time of the ouster action. It was perfectly clear that the bulk of the unions which so overwhelmingly voted for the ouster of their biggest brother from the family did so reluctantly. Only a very few showed any glee at all for this opportunity to retaliate against a bully at whose hands they may have suffered. While James Hoffa's traditional enemy in Detroit, Walter Reuther, wept no tears of remorse, he, at least, assumed the pose of a man acting more in sorrow than in anger. The president of the next-largest union, the Steel Workers, appeared to be publicly consoling the Teamster's representatives who were permitted to appear on the floor of the convention while nevertheless voting for their ouster.

Both sides, however, publicly announced their desire to avoid harming each other and to work toward conciliating their differences in the not-too-distant future. The whole affair clearly had the appearance of a divorce action in which the parties were still loudly declaring their need, if not their love, for each other. It would appear, therefore, that no widespread inter-union warfare is likely to break out at once and, depending on future developments, it may never really occur.

In anticipating the next developments, it is important to remember that the vote for ouster was by no means unanimous. While the official figures show that delegates representing approximately 10.5 million organized workers voted for ouster, it must be remembered that delegates representing more than 2.25 million workers voted against the ouster. The resulting vote provided more than the necessary two-thirds required for expulsion.

It must also be pointed out that the Teamsters, with over one million six hundred thousand votes and five other smaller unions were under suspension and were therefore not permitted to vote. If they could have voted, it is likely that all would have voted against explusion, which would have increased the total vote against expulsion to more than four million. The two-thirds majority would then have been relatively shaky. Another group of six rather small unions abstained from voting.

Those who voted against expulsion and those who abstained may generally be regarded either as friends of the Teamsters or unions who fear the Teamsters. In any event, they are important in assessing the future relationships among various unions. Unless a rather substantial house-cleaning takes place first, it is less likely, although not impossible, that the Teamsters will engage in predatory activities against them than against those unions which have gone on record as being unwilling to associate themselves in the same federation with the Teamsters.

For this reason, the following list may be especially instructive. An employer whose establishment is organized by one of the following unions can regard himself as fortunate from one point of view, in that he is unlikely to face a raid from the Teamsters. On the other hand, he may have to continue bearing the misfortune of dealing with a union which is closely associated with these same Teamsters. The unions which voted *against expulsion* are the following:

Carpenters
Brick and Clay Workers
Elevator Contractors
United Garment Workers (to be differentiated from both the Amalgamated Clothing Workers and the International Ladies Garment Workers)
Flight Engineers
Glove Workers
Hotel and Restaurant Workers
Lathers
Meat Cutters
Mechanics Educational Society
Sheet Metal Workers
Office Employees
Pattern Makers
Switchmen
Typographical Union
Upholsterers
Boot and Shoe Workers
Hod Carriers

The unions who abstained from voting are:

Bill Posters
Coopers
Granite Cutters
Post Office Employees
Plate Printers
Street Railway Employees

In addition, a small number of small unions found their delegates split in their voting. These unions are:

Hosiery Workers
Jewelry Workers
Doll and Toy Workers
Allied Industrial Workers

The last three of the latter group will be recognized as unions which have run afoul of the investigation of the Senate Labor Rackets Investigating Committee. The last one managed to clear itself just in time to be seated at the convention.

Next, there is the question: What

Enter 72 on card, page 167

ployees are members of one of the 93 International Unions who voted for expulsion? Here the situation is rather cloudly. The Teamsters Union has a mutual assistance agreement with some of these unions, including some very powerful ones, such as the Machinists. Presumably, with expulsion, these agreements become null and void.

However, no enforcement of such action appeared to be contemplated by the A.F.L.-C.I.O., at least, not for some time. This fact is a reflection of the reluctance actually to cut the Teamsters off before every effort has been made to bring them back in. Accordingly, it is likely that mutual assistance will continue although, probably, on a less enthusiastic basis. If one of these unions needs the Teamsters very badly, it can be expected that the Teamsters will exact a price for such assistance. But this is not very different from the situation in the past, since the Teamsters have built a firm reputation for rarely doing something for nothing.

Finally, what can employers, whose employees are directly organized by the Teamsters Union, expect? In this situation, the answer seems to be more obvious. Until the situation changes substantially, they can expect behavior no different from that experienced in the past. By and large, the Teamsters Union has no real feeling of insecurity. Their treasury is just as full now as it ever was, save for some high legal fees which it has been paying recently. In the future, it will continue to grow and have, in addition, the funds which it would otherwise have paid as *per capita* dues to the A.F.L.-C.I.O. Except for Dave Beck and perhaps, James Hoffa, the *dramatis personne* will be the same. The employer is likely to find himself dealing with the same business agent, operating at the same old stand in the same way. No substantial difference in the bargaining relationship will be noticeable without a real clean-up.

If and when this does occur, many employers may find themselves, at least temporarily, in a less comfortable position than they are now, because they may be caught in a crossfire between the "clean-up" and "stand-pat" factions in the local union. They will bear this discomfort hopefully, so that they may in the future have the opportunity to deal forthrightly with honest adversaries.

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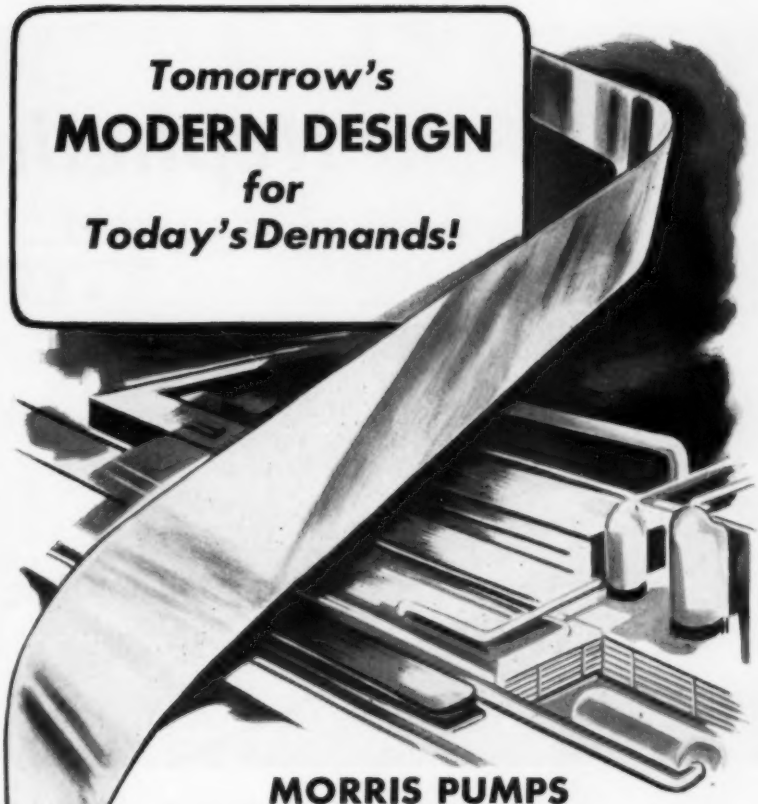

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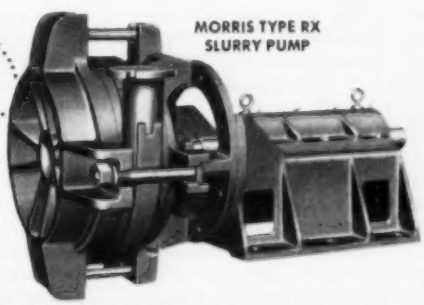

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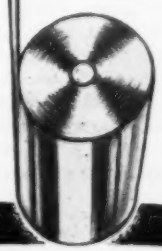

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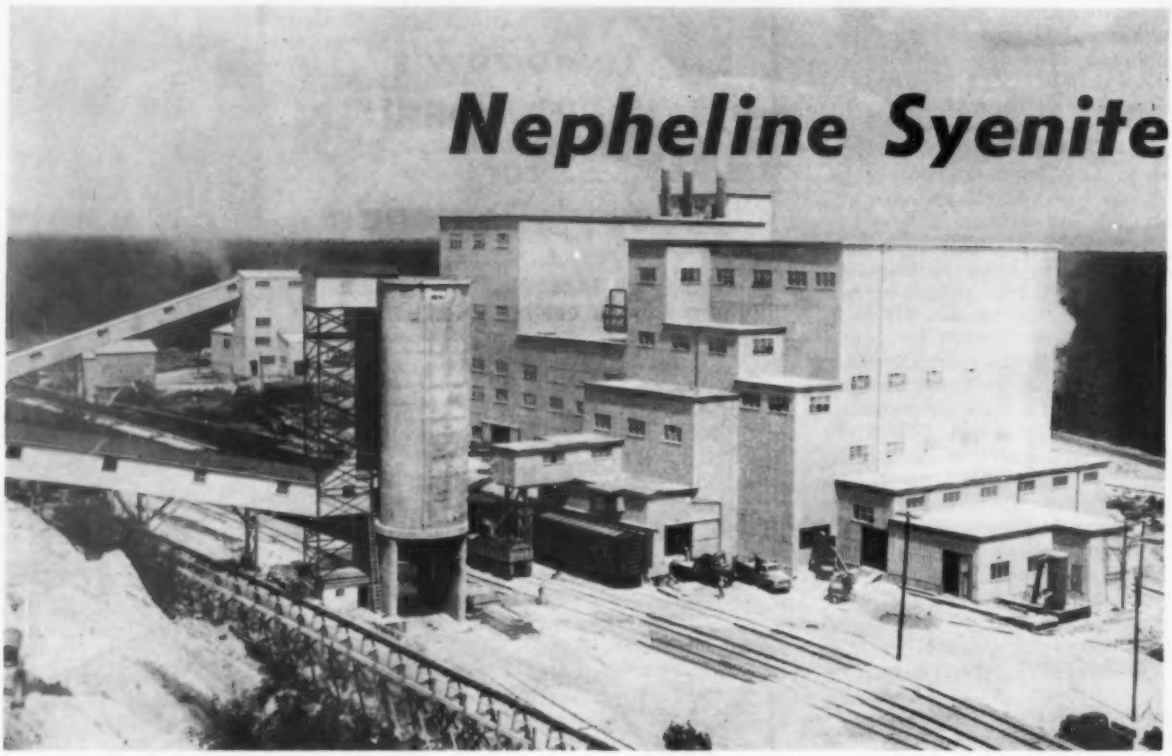
Nepheline Syenite



A general view of the new nepheline syenite plant of American Nepheline Ltd. at Nephton, Ont. The conveyor (left background) receives raw material from the crushing and storage department.

ANOTHER ON THE SPOT REPORT

By WALTER E. TRAUFFER

ONE of the earth's rarer minerals is nepheline syenite, a sodium aluminum silicate rock which has gained wide acceptance in the ceramic industries in competition with feldspar. Only two deposits of commercial importance are known to exist; one is in Russia and the other is Blue Mountain at Nephton, 20 miles north of Lakefield, Ontario. This deposit was first opened in 1935 by American Nepheline Ltd., then known as Canadian Nepheline Ltd. The demand for this product, as well as the expanded marketing area, has resulted in a number of interesting transitions in the mining and processing of this material, which have been thoroughly covered in past articles in PIT AND QUARRY. The latest link in this chain is a new 600-ton-per-day plant which embodies the most modern features of design, equipment, and control.

The company's first plant was a 40-ton-per-day operation at Lakefield. This mill supplied Canadian needs effectively, but the larger markets in the United States could not be developed because of the high duty on the finished product. As a result, in 1936, this company, then known as the American Nepheline Corporation, merged with Ventures Limited and in 1937 built a 100-ton-per-day mill[1] at Rochester, N. Y., which received duty-free raw ore in cars *via* ferry across Lake Ontario and processed it for United States consumption.

This plant was later enlarged and improved, but in 1946 the Lakefield storage and trans-shipment facilities had to be expanded, and some processing equipment was installed there. In 1947 a new 400-ton-per-day plant was built at Nephton to increase production further both in Canada and the United States. At the same time the workings which started out as open quarrying and then went to underground shrinkage stope mining during the winter months, went back entirely to open quarrying in another part of the deposit.

Early in 1951 the all-year car ferry from Cobourg, 35 miles south of Lakefield, to Rochester went out of business. As there was no other economical way to ship the ore to Rochester, that plant was dismantled, and the equipment was added to the Nephton and Lakefield plants. This expansion program[2] was completed in mid-1951. This development actually improved the competitive position of the company as the major United States markets had moved farther west and the freight rate differential between raw and finished nepheline syenite had been considerably reduced. About 75 percent of production with this new setup went to the United States by rail *via* Buffalo. Production efficiency and costs were also improved by the operation of one 10,000-ton-per-month plant in place of two 3,000-ton plants.

The story was not yet ended, how-

[1] See PIT AND QUARRY, January, 1940, pp. 70-72-74, for a complete description of these operations.

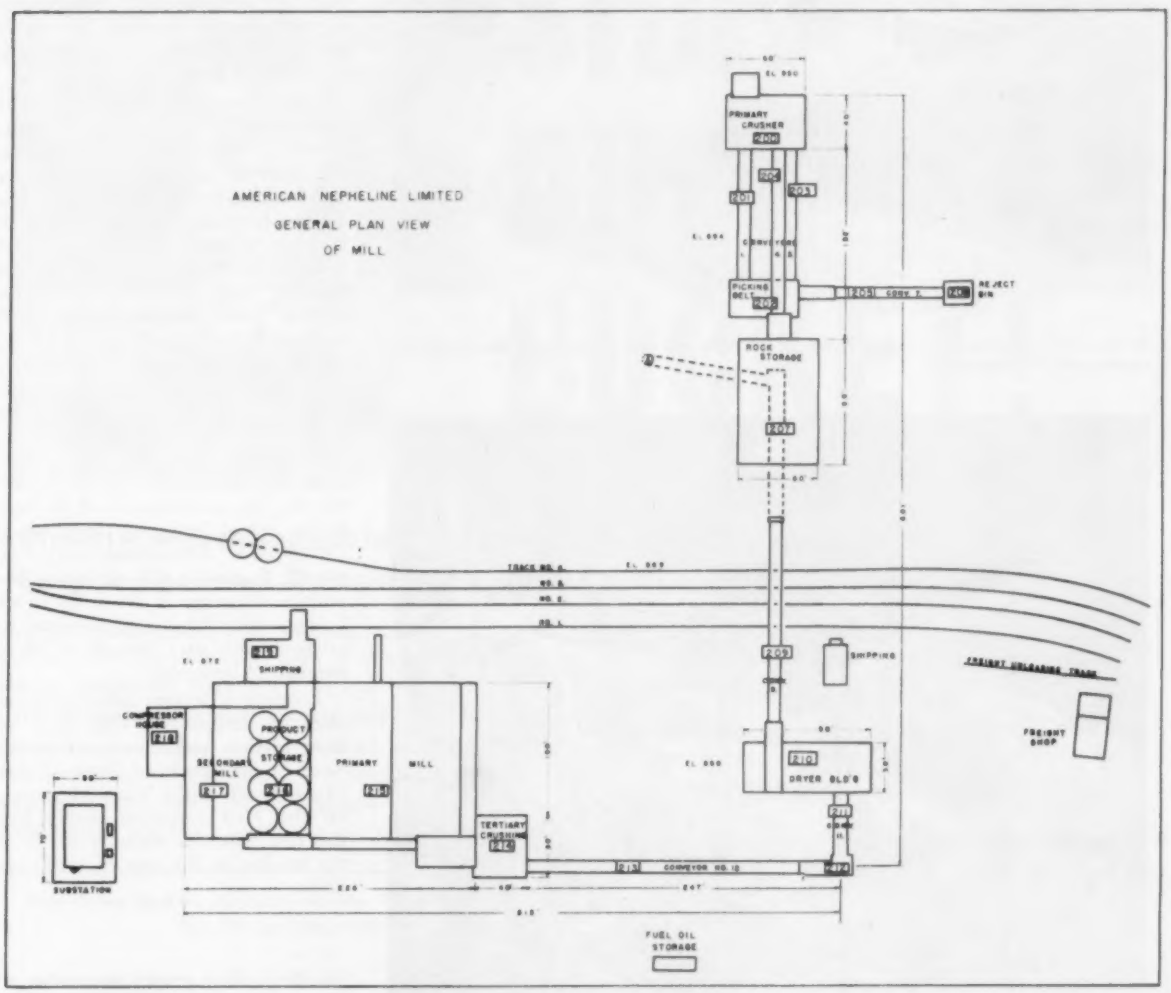
[2] See PIT AND QUARRY, November, 1951, pp. 90-94, for a complete description.

a modern product

from a modern plant

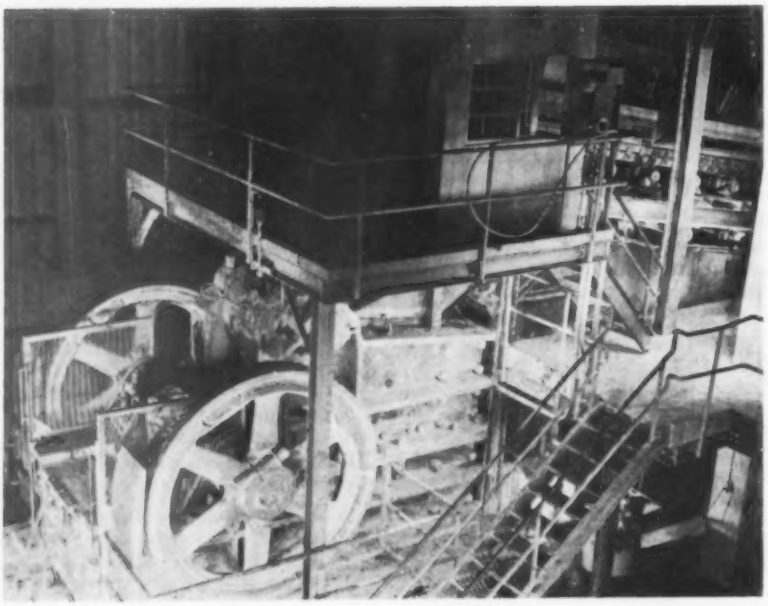
ever, as demand kept increasing steadily to the point where another major expansion was necessary. In December, 1954, truck shipments were replaced by rail shipments from Nephton *via* a 17.5-mile branch line built by the Canadian Pacific Railway from Havelock, Ont. This change and the desire to consolidate Lakefield operations with those at Nephton, were the major considerations which influenced the decision to build a larger and more efficient plant at Nephton. The fire hazard at the old wooden operations was also a factor. Construction of the new 600-ton-per-day plant was begun in June, 1955, and it went into full operation in September, 1956.

This new plant has a number of special features. Not only is it of modern, fireproof construction and efficient design, but it was also designed to provide for future expansion at the minimum of expense. Its present 600-ton-per-day capacity can be doubled at any time by merely adding more processing units. All handling equipment—conveyors, elevators, etc.—can take care of this added load. A 4,500-ton rock storage building permits a working schedule of 8 hours per day, 5 days per week,



One of the two shovels in the quarry, loading to a 15-ton truck which hauls to the plant.

At the left is the primary crusher building; at the right, the rock storage, with the reclaiming conveyor to the main plant.



The 48- by 42-in. primary jaw crusher, with the pan feeder and grizzly at the right.

in the crushing and mining departments, while all subsequent milling departments operate continuously. Flexibility is a feature, alternate flows being provided to meet changing needs. All equipment is located for easy maintenance. Every possible step is also taken to maintain product quality and insure uninterrupted production. Safety and cleanliness are factors in every step of the operation.

The deposit is of almost unlimited extent, the entire Blue Mountain being a solid deposit of nepheline syenite. It is pear-shaped, 5 miles long by ¼ to 1 mile wide, with an average height of 350 ft. above the surrounding country. Nepheline syenite is a white igneous rock resembling granite in texture and hardness. It consists mainly of the following minerals: 54 percent albite feldspar; 20 percent microcline feldspar, and 22 percent nepheline; it contains little or no free quartz.

Quarrying is now being done in an area about ¾ mile from the plant which is entirely free of corundum. The light soil overburden is removed by a bulldozer. The quarry is worked in four benches, 35, 40, 40, and 35 ft. high, respectively, over a length of 2,000 ft. Drifter drills are used for opening shots, for cleanup and in uneven spots; but the regular drilling is done with a 4½-in. Joy Challenger self-propelled rubber-tired drill which replaced the churn drill formerly used. This unit has a Joy tungsten-carbide 4-wing X bit and drills about 20 ft. per hour. Blast holes are spaced 8½ by 10 ft., and the average shot consists of 20 holes in two rows, bringing down about 10,000 tons. Ammonium nitrate explosive is used in 4½-in. holes. Secondary shooting is done by blockholing, and Primacord is used for greater safety and because of its resistance to moisture.

Loading is accomplished with two electric shovels — a 1½-cu. yd. Bucyrus-Erie and a 1-cu. yd. Northwest. Four trucks — three 15-ton Mack diesels and a 5-ton Mercury — all with Heil end-dump bodies, haul the raw material about 4,000 ft. to the crusher at the rate of 1,100 tons daily.

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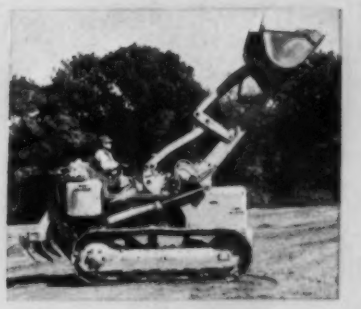
the TRAXCAVATOR'S  *new...*

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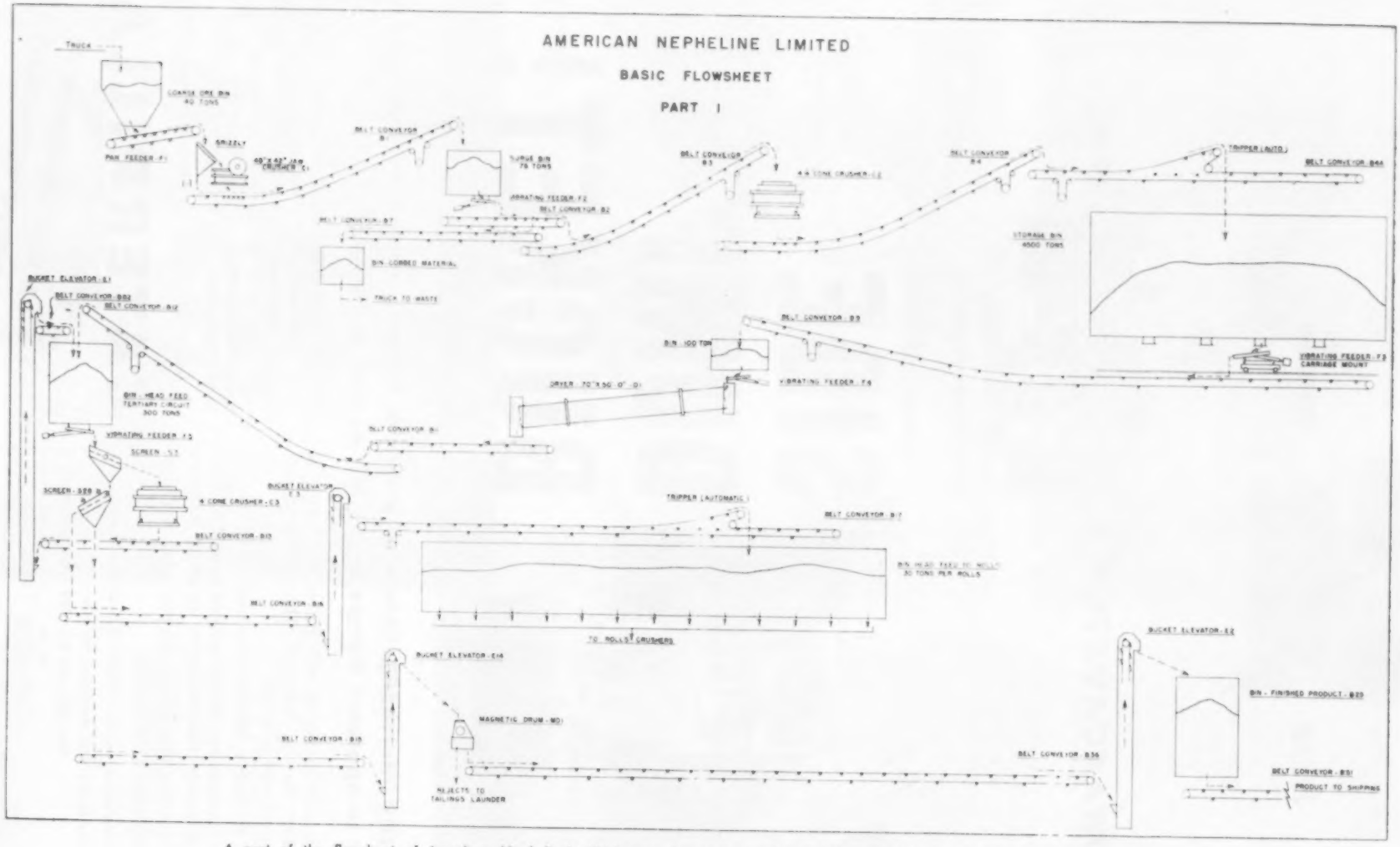


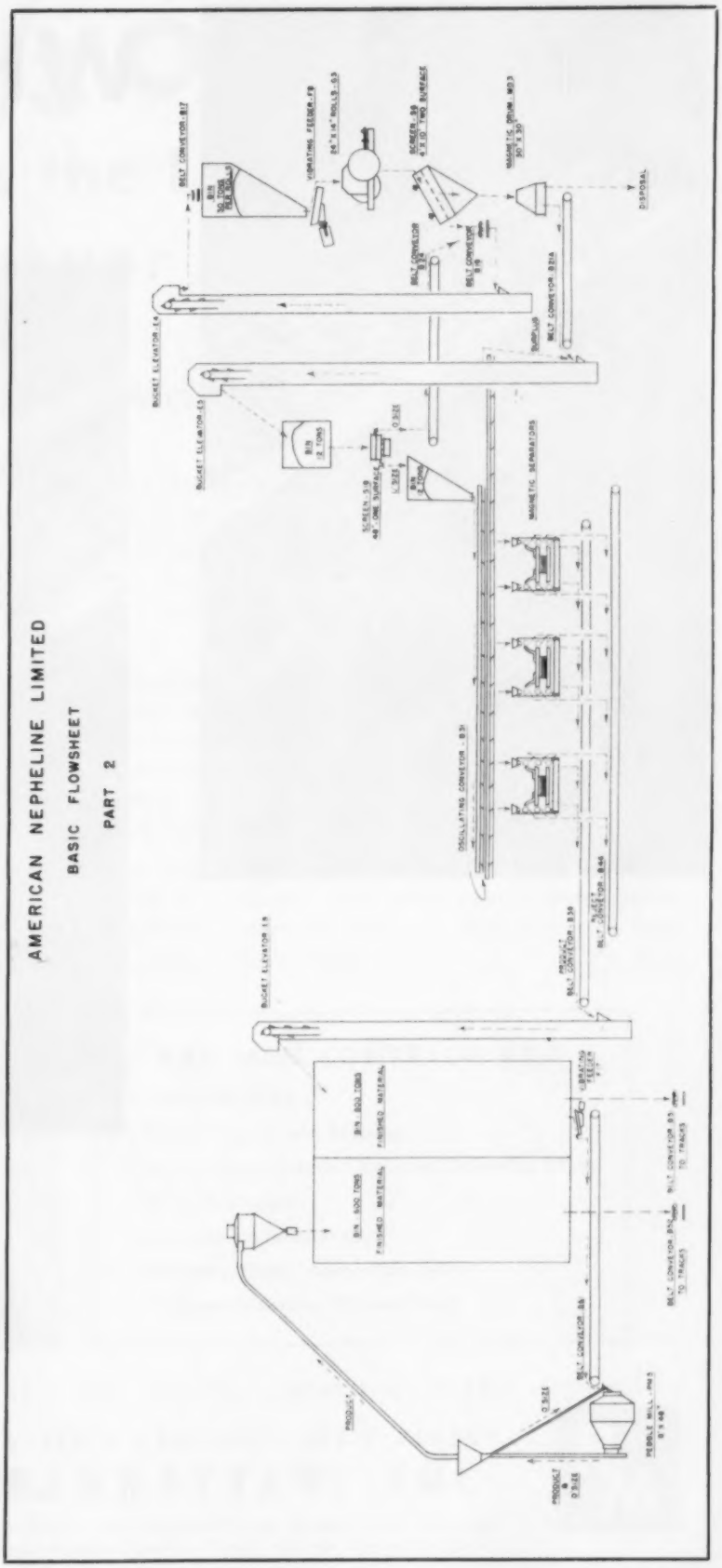
A part of the flowsheet of American Nepheline's 600-ton-per-day operation at Nephton, Ont. The second portion follows on page 81.

At the plant the trucks dump the ore on a 4- by 8-ft. United Steel Corporation (Dodge Mfg. Div.) constant-speed manganese pan feeder ahead of a 5-in. sloping bar grizzly. The oversize (5-in. plus) goes to the 48- by 42-in. Allis-Chalmers primary jaw crusher, which is driven by a 150-hp. motor. The minus 6-in. product and the minus 5-in. material through the grizzly are carried on a 30-in. by 179-ft. belt conveyor (B1) to a 75-ton surge bin in the picker building. A 36-in. Syntron electric vibrating feeder discharges from the bin onto a 48-in. by 30-ft. horizontal belt conveyor (B2), where biotite rock and any other undesirable material, forming about 1½ percent of the tonnage, are picked off by hand. This material is carried on a 20-in. by 159-ft. conveyor (B7) to the cobbed material bin.

A 30-in. by 159-ft. belt conveyor (B3), over which there is a Dings suspended magnet to remove any tramp iron, carries the material back to the crusher building and discharges it into the 4¼-ft. Symons standard cone secondary crusher. The minus 2-in. product is carried by belt conveyors B4 and B4a—30-in. by 196-ft., and 30-in. by 110-ft. —to the 4,500-ton capacity raw-storage building, into which it is discharged by means of a 30-in. by 96-ft. traveling tripper belt conveyor.

This building was built on a fill lined with an inverted cone of natural material in order to get maximum live storage. Material is reclaimed through four draw holes in the roof of the reclaiming tunnel by means of a movable Syntron feeder. A rough blend is obtained by discharging into the storage in layers. Reclaiming conveyor B9, 20 in. by 322 ft., feeds from storage to a 100-ton feed bin ahead of the rotary dryer. A Syntron feeder serves the 70-in. by 50-ft. Hardinge Ruggles-Cole XH-10 parallel-flow dryer, which is oil-fired by a Hauck burner. This unit is direct-fired but has a combustion chamber, and there is no direct flame on the rock. The moisture content of the minus 2-in. rock is reduced from about 6 percent down to less than 1 percent at the rate of about 50 t.p.h. The exhaust gases are drawn through a 15,000-c.f.m. American Air Filter Company wet Rotoclone, which discharges the dust to waste as a sludge.

The dried rock is carried on 20-in. by 86-ft. belt conveyor B11—which has a Dings permanent magnet pulley—and 20-in. by 293-ft. belt conveyor B12 to a 300-ton bin in the main mill building. Two parallel cir-



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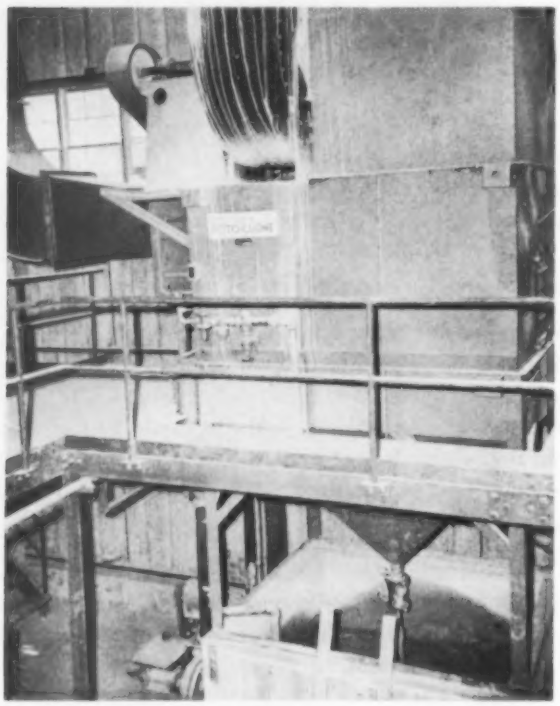
cuits carry minus 2-in. rock from the bin to the third stage of crushing. Synton feeders discharge from this bin to a pair of 3- by 10-ft. Screen Equipment Company Seco 2-deck screens with ⅜-in slotted and $^{3}/_{16}$-in. slotted cloth. The ¼- to 2-in. material off the top deck goes to the 4-ft. Symons short head tertiary crusher (C3) and is carried by an 18-in. by 32-ft. belt conveyor (B13) and a bucket elevator (E1) back to the dried rock bin.

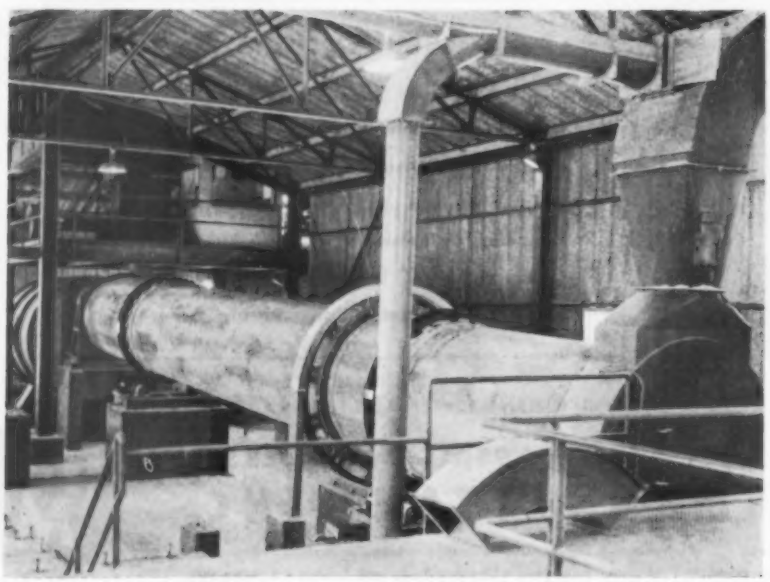
The minus ¼-in. material off the bottom decks of these screens goes to a pair of 4- by 10-ft. Tyler Hum-mer 2-deck screens with 30-mesh cloth on one deck. The ¼-in. to 30-mesh material off this deck is carried on an 18-in. by 46-ft. conveyor (B16) to a bucket elevator (E3) to a 30-in. by 138-ft. horizontal distributing belt conveyor (B17) which has a traveling tripper for distributing this material into the feed bins of the 10 roll crushers.

The minus 30-mesh material from the Hum-mer screens is carried by a 14-in. by 57-ft. belt conveyor (B15) and a bucket elevator (E14) to a 30- by 30-in. Stearns MD1 magnetic separator. This removes magnetite, and the cleaned product can follow either of two flows. It can go *via* a 14-in. by 125-ft. belt conveyor (B36) and bucket elevator E2 to 150-ton storage bin No. 11 as "B25" finished product; or it can go *via* a 14-in. by 14-ft. conveyor (B72) and a 14-in. by 18-ft. conveyor (B21) into the 30-mesh iron separation circuit for further processing.



The wet dust collector connected to the rotary drier. Reclaimed dust is wasted in the form of sludge.

Below: This view shows the 70-in. by 50-ft. parallel-flow rotary drier, with the combustion chamber in the background. At right is the connection to the dust collector.



The 10 roll crushers are 24- by 14-in. Exolon dual units (G1 to 10 inclusive), and they are fed ¼-in. to 30-mesh material from the bins by Syntron electric vibrating feeders. Each roll discharges on an individual 4- by 10-ft. Hum-mer 2-deck screen with 30-mesh cloth on one deck. Slotted cloth is used on these screens for maximum capacity. The plus 30-mesh material off the top decks of these screens is carried by a 24-in. by 115-ft. belt conveyor (B18) and bucket elevators No. 4 and 4a back to conveyor B17 in closed circuit.

The minus 30-mesh material from these 10 screens, being a finished size, is led directly to the treatment circuit. It is chuted into six 30- by 30-in. Stearns drum-type magnetic separators (MD2 to 8 inclusive). The magnetite from these separators is carried on an 18-in. by 97-ft. belt conveyor (B70) and a bucket elevator (E15) to a 40-ton bin.

The cleaned product from the six drum separators, "B30," goes *via* 14-in. by 18-ft. belt conveyor (B21A), etc., and elevator, to 12-ton storage bins. These feed one or more 48-in. Sweco circular screens which make a 30-mesh separation on square mesh cloth. This removes any slabs or plates passing through the Hum-mer screens and insures accurate sizing. The undersize material goes by chute to 12-ton head feed bins for the final magnetic separators. These bins feed to five series of Link-Belt Flexmount oscillating conveyors. The latter have a feed length of 70 ft., a return length of 80 ft. and a sloping crossover, and are designed to feed from both legs alternately. Each conveyor is capable of feeding 10 separators, but at present there are 10 separators on one line and 5 on each of the other 4, for a total of 30. Any surplus from the return legs is returned to the surge bins *via* bucket elevators (E5).

Several makes of separators are now used, but the company is standardizing on Exolon double separators, of which eight are now in use. Most of the others are older Dings single

units. All are 3-roll high-intensity induced roll separators, and all remove iron-bearing minerals.

The iron-bearing or reject minerals go to a 14-in. by 48-ft. belt conveyor (B46) and then to tailings or to an 18-in. by 94-ft. conveyor (B69) and a bucket elevator (E16) to a pair of Dings 4-roll retreatment separators. The waste from these units also goes to tailings. The product is carried *via* an 18-in. by 18-ft. belt conveyor (B71) and bucket elevator E17 to a 50-ton storage bin for "C" grade material.

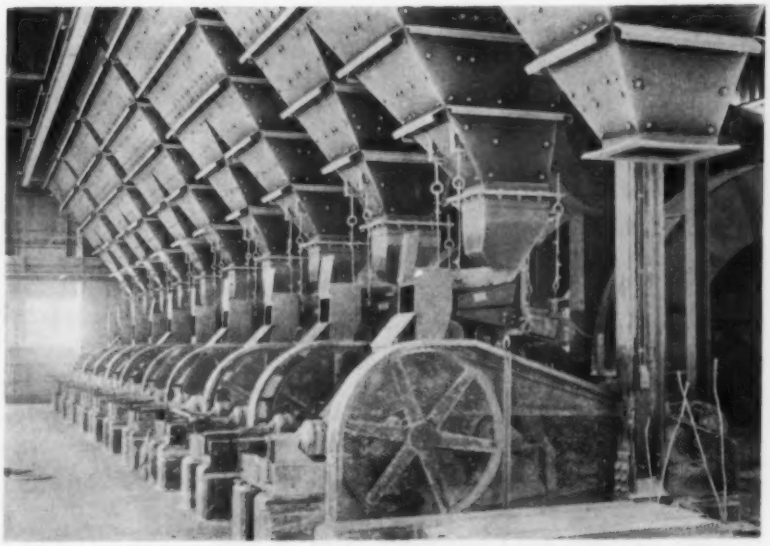
The "A30" product of the 30 separators is carried by a series of two 14-in. belt conveyors—56 ft. (B38) and 13 ft. (B43)—to a bucket elevator (E8) to either of two 850-ton storage silos for "A30" or glass material.

The above equipment in the mill is connected to three units of Buell 120,000-c.f.m. dust collectors, each with four cyclones. The collected dust goes to a pair 4-in. by 85-ft. Fuller-Huron Airslides (B73 and 74). These feed a pair of 48-in. Sweco screens which make an 85-mesh separation. The oversize goes to tailings. The undersize is taken to a pair of Eriez drum-type magnetic separators (MD6 and 7) and to a 50-ton bin for "B100" grade product. The waste from the separators also goes to tailings.

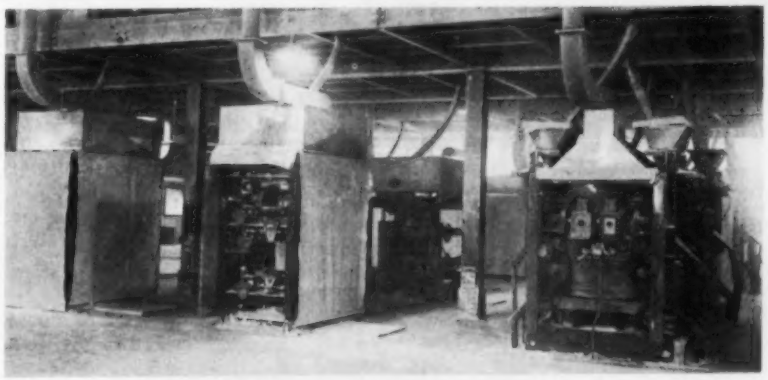
Two methods are employed to produce "pottery grade" products. Six pebble mills and a pre-grind pebble mill are fed with the "A30" from the bins. Six pebble mills produce "A200" and "A270" products; the pre-grind mill precedes a fluid energy mill.

The "A30" from Silo 8 is fed by a Hardinge constant-weight feeder to a 14-in. by 42-ft. belt conveyor (B57) to a 9-ft. by 60-in. Hardinge conical mill, feed being controlled by an electric ear. This unit, a gravity discharge pebble mill, operates in closed circuit with a 90-in. Gyrator air classifier, and produces "A200" material which is conveyed by air from the classifier to 650-ton storage silo No. 4. The oversize is returned by gravity to the mill feed.

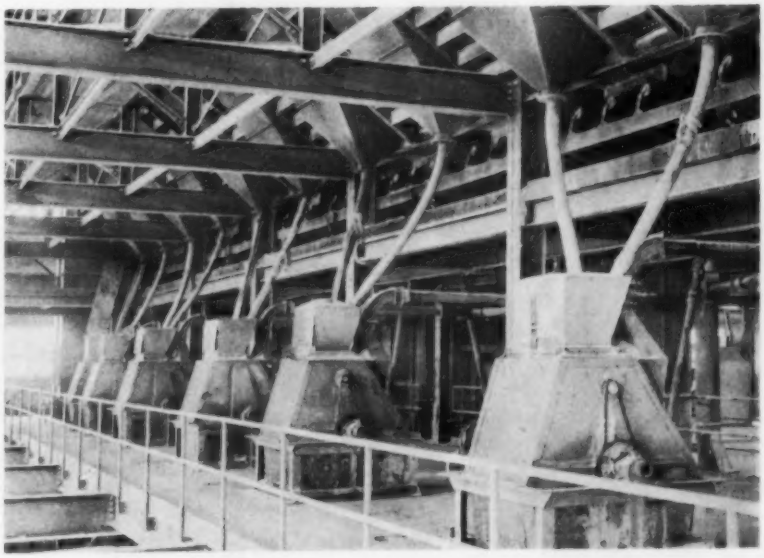
The other five mills, four 8-ft. by 48-in. and a 10-ft. by 66-in. conical pebble mills, have similar circuits. They have Jasper Silex lining and pebbles and are direct-driven through fluid couplings. The four smallest mills are air-swept, and the others are the gravity-discharge venturi



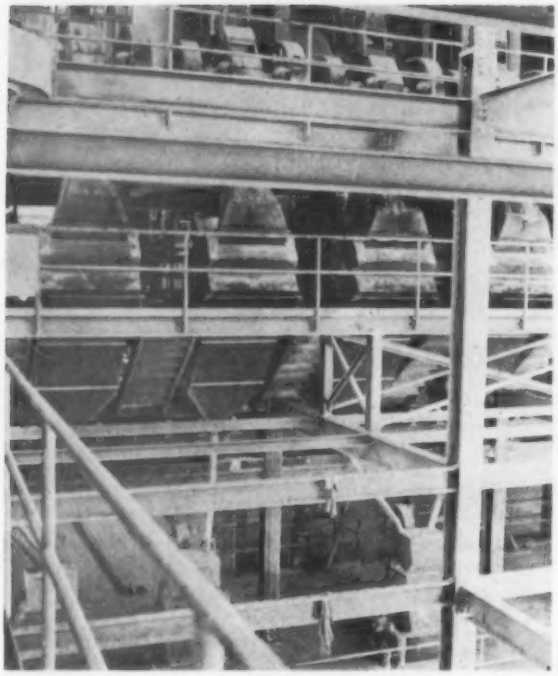
There are ten 24-in. by 14-in. dual grinding rolls, with electric vibrating feeders above. These are fed ¼-in. to 30-mesh material.



Some of the 30 3-roll high-intensity magnetic separators which remove iron-bearing minerals from the product.



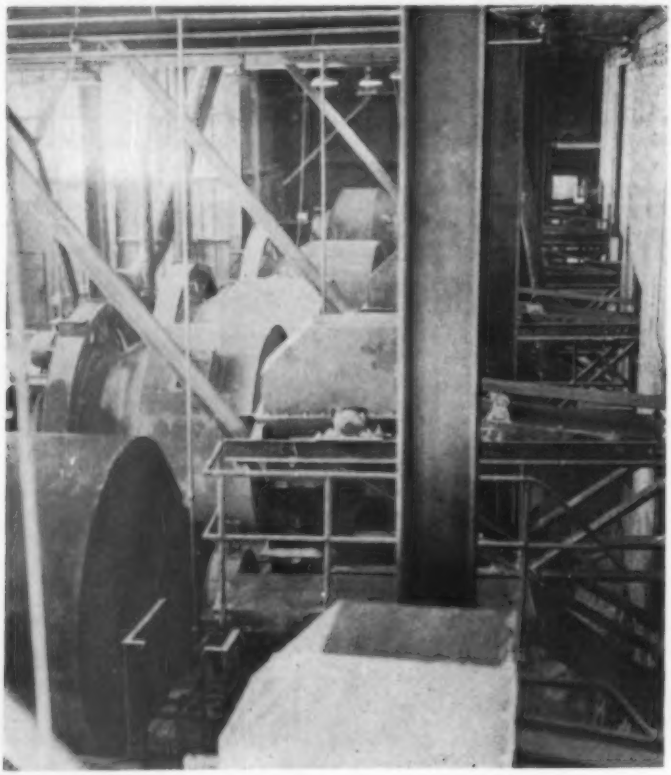
The six 30- by 30-in. electro-magnetic drum-type separators, which receive minus 30-mesh finished product from the screens.



Some of the ten vibrating screens which make 30-mesh separation of the grinding rolls above them.

These three 48-in. circular screens insure accurate sizing of the finished product from the drum separators.

Five of the conical pebble mills used in the manufacture of a pottery-grade product. Feed conveyors from the bins are at the right.



pickup type. Each mill operates in closed circuit with Hardinge air classifiers. Airslides are used to carry the finished product to the four 600-ton and two 150-ton bins.

In the second or pre-grinding circuit 20-in. by 112-ft. conveyor B51, elevator E12, and 20-in. by 42-ft. conveyor B67 feed to a 30-ton head feed bin. A Syntron feeder serves an 8-ft. by 36-in. Hardinge conical pebble mill (PM7) operating in open circuit. The product is taken by an 18-in. by 10-ft. belt conveyor (B79), elevator E11, and a 14-in. by 29-ft. conveyor (B68) to a pair of 12-ton storage bins.

Merchen constant-weight feeders supply the two Wheeler fluid energy mills. These make extra-fine products "A270" and "A400." Each mill uses 1300 c.f.m. of free air at 100 lb. pressure and superheated to 850 deg. F. by Todd air heaters. This air is circulated at supersonic speed in the doughnut-shaped chamber, and reduction is accomplished through impact of the particles with one another and with the walls of the chamber. The "A400" product goes to Silo No. 2 and the "A270" to Silo No 1, first passing through a pair of cyclones above each silo.

The eight finished-material silos are arranged in two rows of four. Four are of 800-ton capacity each, and four are 600-ton, and they have three 150-ton interstice bins.

The "B100" dust is fed from the bin to a St. Regis 2-tube bagger, or it can be carried on 18-in. by 50-ft. belt conveyor (B78) to cars for bulk loading.

The "C" grade material is fed by 18-in. by 57-ft. belt conveyor B75 to 20-in. by 60-ft. belt conveyor B65 for bulk loading. It can also be dis-

charged *via* a bucket elevator (E12) into a 45-ton bin over a St. Regis 1-spout abrasive materials packer.

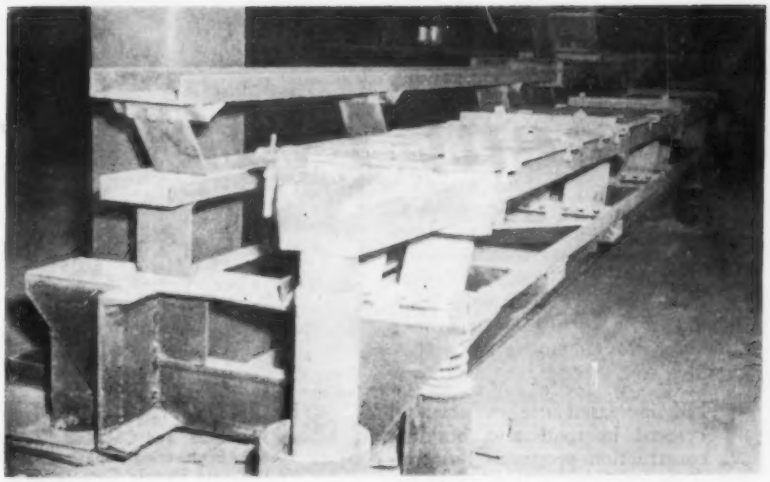
The glass sand from four silos is carried by belt conveyor B51, which is equipped with a Merrick Weightometer, to conveyor B65 for bulk loading. It can also go *via* elevator E12 to the above-mentioned bin and bagger.

The B52 glass sand is fed by a Syntron feeder on conveyor B51 and *via* the same route.

Pottery sands ("A200," "A270" or "A400") are fed by Fuller-Huron Airslides from four silos on a 24-in. by 112-ft. belt conveyor (B52), which is equipped with a Merrick Weightometer. A 24-in. by 45-ft. conveyor (B66) is used for bulk loading, and elevator E13 feeds a 45-ton bin over a 2-spout St. Regis packer.

Eleven products of different grades and finenesses for a wide range of uses are made in this plant, the most important being the glass, chinaware, and porcelain ware markets. Included also are products for the manufacture of mineral wool, glass fiber, floor and wall tile, dental porcelain, enamel frits, and structural clay products. All grades and by-products except magnetite can be shipped either packaged or in bulk. Magnetite is shipped only in bulk by rail or truck.

Power is purchased from a public utility at 44,000 v. and is reduced to 2,200 v. for the compressors and pumps, and to 550 and 110 v. for other purposes. All starting systems are of the enclosed dustproof type; there are pushbuttons at the machines, and all wiring is in ducts and conduits, out-of-doors bus-duct. The motors installed total 3,000 hp.



One of the five two-leg oscillating conveyors, each of which is capable of feeding ten high-intensity magnetic separators.

All conveyors and bucket elevators are driven through Dodge torque-arm reducer units. United Steel (Dodge Div.) conveyors and Goodrich conveyor belting are used throughout. All bucket elevators are Hewitt-Robins.

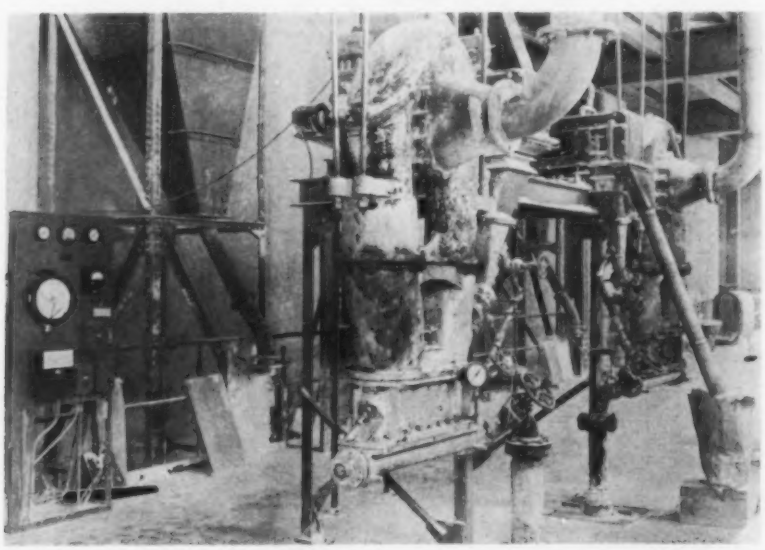
Water for the operation is obtained from two pumps, 375 and 600 g.p.m., respectively, installed at a clear lake. This source now supplies process water, the fire protection system, etc., and after chlorination and other treatment also the drinking water.

Compressed air for the quarry is supplied by a 1,200-c.f.m. Ingersoll-Rand compressor in a building near the plant. Air for plant use comes from a Joy twin compressor of 2,730-c.f.m. capacity, driven by a 500-hp., 2,200-v. synchronous motor. A 250-c.f.m. Ingersoll-Rand compressor is used for general service.

Cleanliness and comfortable conditions for the workers are maintained by every possible means. All conveyors, elevators, screens, etc., are enclosed, and all dust points are connected to dust collectors. The upper floors of the various buildings are swept with vacuum cleaners.

The plant was designed by the Kilborn Engineering Company of Toronto, in co-operation with the company's engineering staff. Construction and machinery installation was done by the Norcanda Construction Service, Ltd., The Foundation Company, and the Central Bridge Company. The buildings are all steel and concrete construction with asbestos-cement siding. Most of them have flat roofs of Haydite slabs and built-up roofing.

American Nepheline, Ltd., is affiliated with Ventures Ltd., a large mining organization with operations throughout the world. Its officers are: A. L. A. Richardson, president; Ernest Craig, vice-president and general manager; Harold R. Deeth, vice-president and sales manager; and D. D. Anderson, secretary-treasurer. E. B. Wright is assistant general manager, John Mather is chief engineer and Dr. C. J. Koenig of Ohio State University is research director. The company's main office is at the mine, and the executive office is in Toronto.



These two fluid energy mills make extra-fine products. Reduction is acomplished by impact of particles at supersonic speed.

Cement Plant Power

By ANTHONY C. LORDI
Mining, Petroleum, and Chemical Section
Industry Engineering Department
Westinghouse Electric Corporation

THE increased use of portland cement in road and building construction programs has triggered an explosive expansion in the cement industry. This expansion has been manifested both in the increase of existing plant capacity and in new plant construction. Cement plant locations are widely dispersed, since the calcareous (lime, marl) and argillaceous (shale, clay) materials from which cement is made are found in large deposits in almost every state. The economic shipping radius of this inexpensive heavy product is rarely more than 300 miles from the quarry.

Cement plants utilize a connected-horsepower per man-employed ration of over 100 to 1. Crushers, grinding mills, kilns, cranes, and conveyors with ever increasing single-motor horsepowers characterize the electrical equipment involved. Ball mills with drives up to 2,000 hp. grind the materials to the consistency of talcum powder. Twenty-five to 30 kw.-h. of electrical energy are required for each barrel of cement produced. (One barrel is the equivalent of four 94-lb. bags.) The typical plant produces 2,000,000 to 3,000,000 bbl. per year, and one plant produces 12,000,000 bbl. of portland cement per year. A 15,000 kv.-a. substation is usually required for a 3,000,000-bbl. per year plant.

Plant Distribution In older cement plants using short kilns, the waste heat available from kiln exhaust gases was used to produce steam for power generation. The recent trend is a longer kiln, or pre-heaters which efficiently utilize kiln exhaust gases to heat the incoming charge. Existing plant generating capacity is being abandoned in favor of purchased power.

A typical portland cement plant distribution system is shown in Figure 1. Utility line voltages range from 22.9 kv. to 115 kv., while existing plant generation is usually at 2,400 volts, 3 phase, 60 c.p.s. Plant distribution voltages are at either 2,400 or 4,160 volts. At these voltages, power is economically distributed with acceptable voltage drops and power losses to power centers at load concentrations. These voltages are also economical for large motor operation. In substation sizes above 7,500 kv.-a. the 4,160-volt dis-

Figure 1—A typical cement plant distribution system.

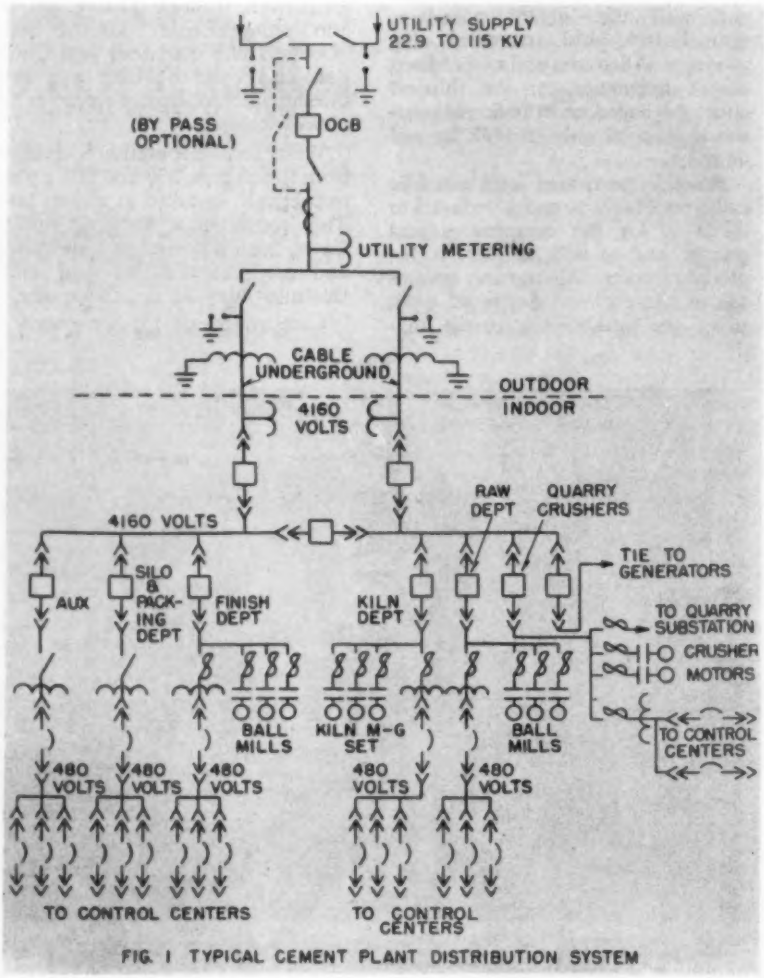


FIG. 1 TYPICAL CEMENT PLANT DISTRIBUTION SYSTEM

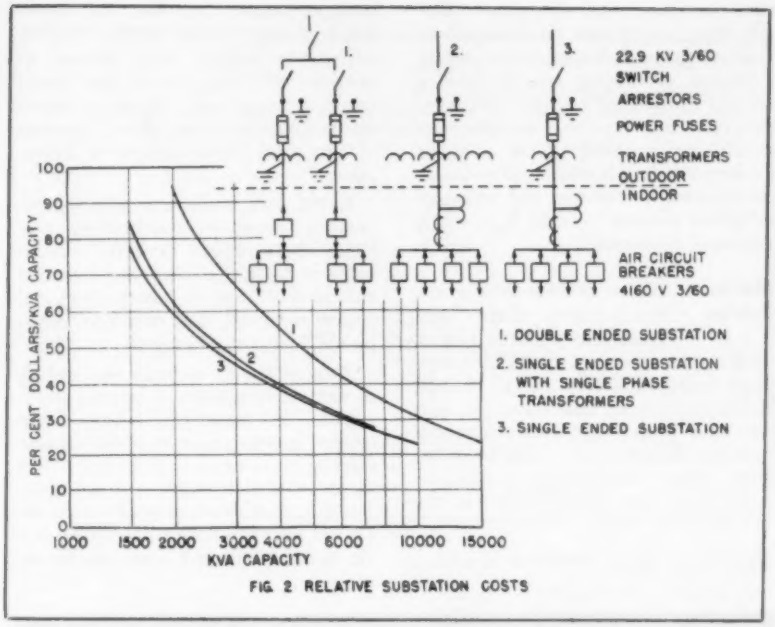


Figure 2—Relative substation costs.

tribution system is preferred over a 2,400-volt system because savings in copper, lower power losses, better voltage regulation, and more usable circuit-breaker capacities are realized.

The 4,160-volt distribution system is neutral grounded, either solidly or through grounding resistors, to minimize transient voltages to ground under fault or surge conditions. Existing 2,400-volt systems are usually ungrounded; and the trend is toward neutral grounding where feasible.

A relative cost comparison of (1) a double-ended substation, (2) a three single-phase transformer, single-ended substation, and (3) a three-phase transformer, single ended substation is shown in Figure 2. In the range of substation sizes usually required in cement plants, the double-ended substation with its greater degree of continuity is preferred. The double-ended substation is advantageous because it permits periodic insulator and bushing cleaning without total loss of power. The next higher class of insulation level is chosen for substation bushings and insulators to minimize insulator flashover due to the cement dust accumulation. Where possible, the substation is located on the windward side of the plant to minimize the dust problem.

Indoor-metal-clad drawout air circuit breakers protect feeder circuits to the various operating departments. Underground cables in ducts terminate in incoming line cubicles of low-voltage power centers, or in high-voltage motor starters located in the plant departments. A typical cement plant lineup of 5 kv. switchgear includes two incoming line circuit breakers and individual department feeder breakers for (a) quarry and crushers, (b) silo and packing department, (c) finish department, (d) kiln department, (e) raw department, (f) plant auxiliaries, and (g) a tie to the generator bus, when it exists.

Emergency diesel-generator capacity is often provided in wet-process portland cement plants. Stand-by power is necessary in the event of power failure to supply air compressors that maintain a continuous source of compressed air for the agitation of storage tanks and slurry thickeners. Without air agitation, the material in suspension will settle out in about 30 minutes. Subsequent removal of this material usually requires jack hammers.

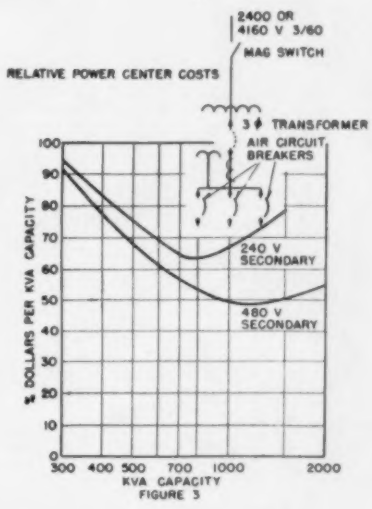


Figure 3—Relative power center costs.

Development of the plant distribution system is usually radial; however, the selective radial system with alternate sources of power in the event of cable faults is coming into more general usage, and it provides an increased degree of reliability. Where the simple radial system has been used, multiple cables with an excess of installed capacity enables quick restoration of power subsequent to a cable fault.

Power Centers The use of 480-volt indoor power centers located at operating-department load concentrations is the preferred arrangement in cement plants. These power centers are usually single-ended and consist essentially of an incoming line compartment with a load-break primary switch and power fuses, an air- or inerteen-insulated transformer, and a low-voltage compartment housing drawout switchgear, all close-coupled. The dry-type air-cooled power center transformer offers advantages of lighter weight and reduced support requirements, and eliminates the hazards associated with liquid-filled transformers. However, if the transformer is to be placed in an extremely dusty or wet location, the inerteen transformer is preferred. The modern trend is to locate the power centers in relatively clean pressurized rooms and use dry-type transformer units.

Relative costs of power centers *versus* power-center capacities are shown in Figure 3. The most economical power centers are between 750 and 1,500 kv.-a. Power centers are almost universally supplied with 480-v. secondaries. With the additional cost of cable and equipment and the poorer voltage regulation associated with the 240-volt system, this lower voltage is rarely justified.

Drawout low-voltage air circuit breakers in the power centers usually cable-feed control centers where groups of motor controls are concentrated. This facilitates maintenance and promotes continuity by isolating individual process functions.

Control Centers Motor control apparatus grouped in free standing cubicles is preferred over individually-mounted control units. Grouped control facilitates interlocking and wiring for sequence-con-

trolled, continuous flow lines used in the modern cement plant. Combination starters, with circuit breakers to isolate faults quickly and safely without the possibility of single-phasing, are preferred for each motor control. Depending upon the stiffness of the plant distribution system, application of control centers connected to power centers with ratings in excess of 500 kv.-a. at 240 v. or 750 kv.-a. at 480 v. requires a close look at control-center protection. Additional impedance or current-limiting fuses may be required to limit fault duty on the standard molded-case air circuit breakers.

The preferred control-center location is a relatively clean pressurized room adjacent to the working area. Dust-protected control desks out in the plant area provide machine operators with control at the driven machinery.

Quarry Distribution Electrically - powered shovels, draglines, pumps, drills, and other portable machinery are used in the cement plant quarry. A single-line diagram of a quarry distribution system is shown in Figure 4.

The widely varying ground impedance that exists necessitates special grounding equipment to maintain personnel safety. Ground faults are limited to a maximum of 25 amp. by a neutral resistor in the quarry substation transformer secondary. Where quarry power is supplied from the plant substation at 4,160 v., an isolation transformer can be employed to enable safety grounding of the quarry distribution system. The grounded side of the neutral resistor (grounded separately from the substation ground to minimize primary surge and fault transients on the safety ground wire) is connected to the ground wires carried in the interstices of the cable fed from the quarry transformer secondary circuit breaker. These ground wires connect to the frames of portable equipment to keep them at the ground potential established by the substation grounding grid.

Low ground-fault currents through both 4,160-v. switch - houses and 480-v. power centers are detected by balanced-flux, window-type current transformers used with sensitive relays for rapid isolation of faulted feeders. Machine frame-to-ground voltages are limited to approximately the product of the maximum ground-fault current (limited by the neutral resistor) and the ground-wire impedance. This voltage is usually well below 100 v.

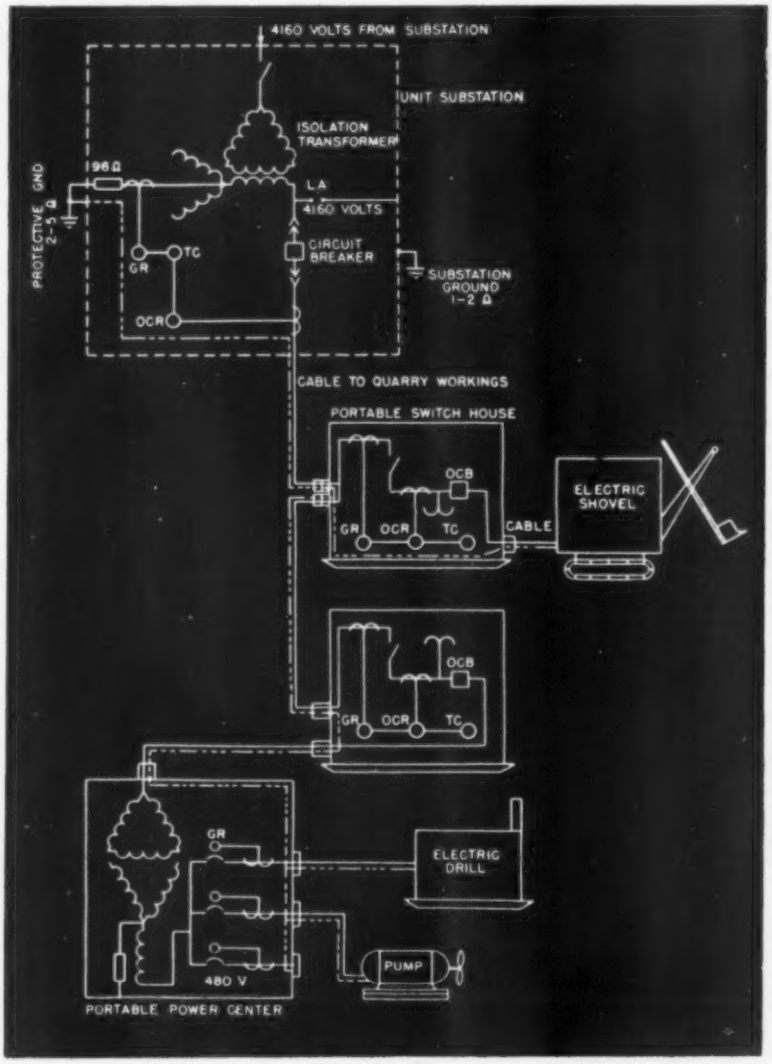
Where delta-connected transformers are in service, the quarry distribution system can be changed to a safety grounded system by adding a zig-zag grounding transformer, a neutral grounding resistor, and suitable relaying. Wye-wye transformers should be avoided unless a delta tertiary winding is employed to minimize harmonic voltages and to insure sufficient ground current flow when a ground fault exists.

Machine Drives Motor horsepowers in cement plants range from fractional - horsepower feeder-gate drives up to the 2,000-hp. large ball-mill drives. Squirrel-cage induction motors, that have low first cost and give rugged maintenance-free performance, suitably drive most plant machinery. Comparatively little d.-c. power is used in the modern plant. The kiln and regulated feeder drives often employ adjustable voltage d.-c. drives to operate efficiently over the speed ranges required; however, these drives amount to less than 5 percent of the total plant connected horsepower.

Large ball mills are almost universally driven by synchronous motors. These motors have the advantages of high efficiency and low first cost in the range of horsepowers and speeds required, and they can aid in power factor correction.

Present power systems are usually of sufficient capacity to permit application of direct-connected, high-torque synchronous motors, supplying the necessary inrush at low power factor with acceptable voltage regulation. Sufficient torques are designed into the motor to insure that the required shaft torque can be de-

Figure 4—A quarry distribution circuit.



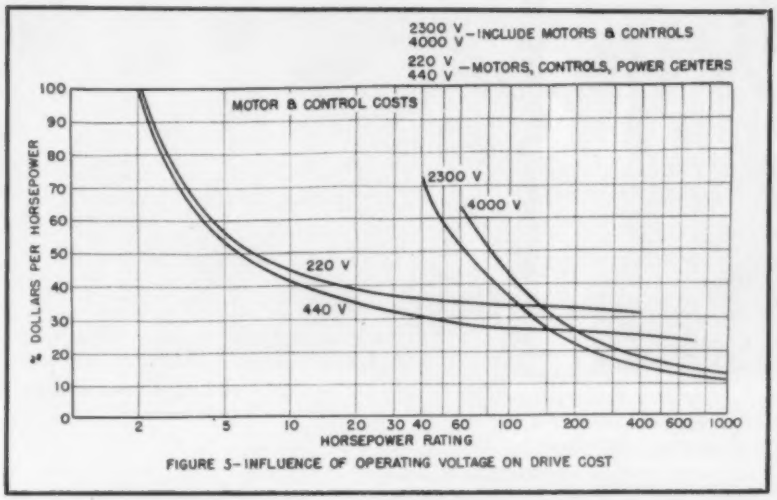


FIGURE 5- INFLUENCE OF OPERATING VOLTAGE ON DRIVE COST

Figure 5—Influence of operating voltage on drive cost.

veloped at the voltages expected during starting and accelerating.

Accurate positioning of large ball mills is required to facilitate charging and discharging of balls and to perform other maintenance. Slow-speed rotation (1/360 of synchronous speed) is effected by using a small (20-40 kw.) d.-c. inching generator and applying a slowly varying, stepped approximation of a three-phase sine wave with an inching control.

Limestone is reduced from large pieces of stone, as quarried, to a one-in. size in two stages. Primary crushing, the first stage in the reduction process, is done by jaw, gyratory, or roll crushers. These crushers are high-inertia, hard-starting machines with high repeated peak loads. The wound-rotor motor with magnetic secondary control serves best.

Secondary crushing is done by hammer mills, impactors, or cone crushers. Special squirrel-cage motors with higher than normal starting and breakdown torques and additional rotor thermal capacity satisfactorily drive these high-inertia loads. Specially constructed synchronous motors are sometimes applied on hammermills and impactors.

Modern kilns are driven by adjustable-voltage d.-c. drives. A speed range of 4-to-1, continously rated at constant torque, is the typical operating requirement. Sometimes intermittent operation over an 8-to-1 speed range is desired to facilitate kiln maintenance. Here, the kiln feeder motor (5 to 15 hp.) speed is varied in proportion to the kiln drive motor (75 to 250 hp.) speed, so that the raw material is fed into the kiln at a rate proportional to the kiln rotational velocity. The separately excited kiln and feeder motors are powered from the same adjustable-voltage d.-c. generator. Provision is made to allow independent speed adjustment and operation of the feeder motor.

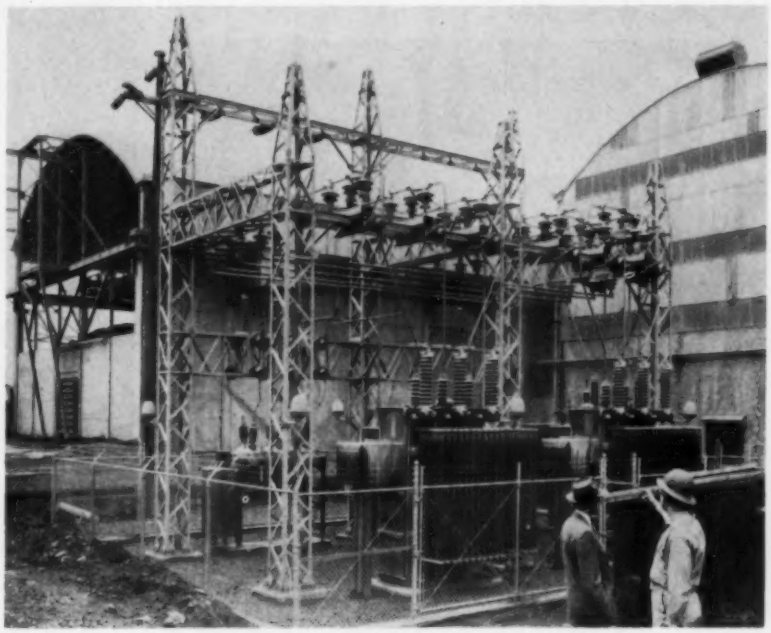
The kiln is usually provided with an auxiliary gasoline-engine drive to provide slow-speed kiln rotation during a power outage. Cessation of rotation when the kiln is at operating temparature can cause the kiln to be damaged by warping.

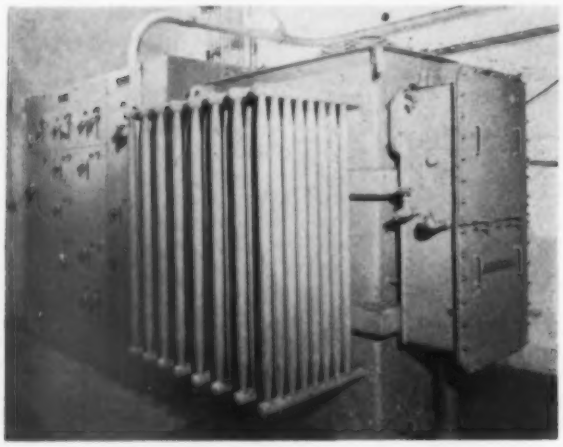
Material is handled in a cement plant by numerous conveyors, elevators, pumps, and overhead traveling bucket cranes. The squirrel-cage induction motor satisfactorily drives elevators and cement pumps and compressors. Conveyors below 60 hp. are usually driven by squirrel-cage induction motors. The wound-rotor induction motor is often used on belt conveyors of 60 hp. and above to accelerate loaded conveyors smoothly up to rated speed within limiting belt stresses.

Overhead traveling bucket cranes are extremely important to over-all plant operation. Failure of the overhead storage cranes would shut down a cement plant in several hours, as these cranes handle practically all of the coal, raw limestone, gypsum, sand, and clinker. The modern trend favors the a.-c. supplied crane. The bridge and trolley motions of this crane are almost universally wound-rotor induction motor driven, with secondary resistance control. The hold- and close-bucket hoist drives are either wound-rotor motor driven, with secondary resistance control, or adjustable-voltage d.-c. drives. When finer speed and torque control and more maintenance-free operation is required, the adjustable-voltage d.-c. hoist drive is used.

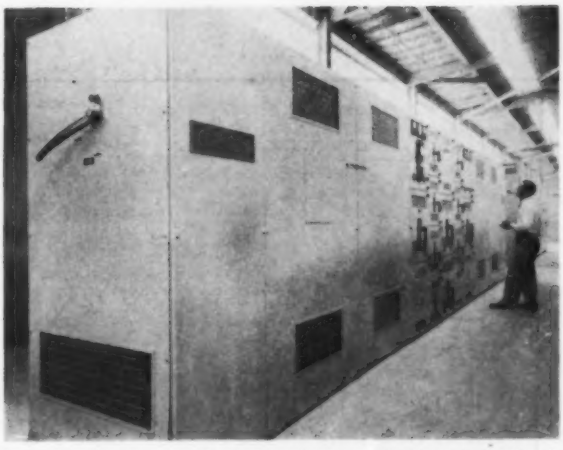
The drip-proof enclosed motor is satisfactory for most cement-plant drives where moderate dust conditions exist. This enclosure minimizes heavy settling of cement dust on windings and commutators, and allows periodic blowing out of the motors with compressed air. In extremely dusty locations the totally-enclosed, fan-cooled motor with external Neoprene rotating bearing

A 15,000-kv.-a. substation supplying cement plant.





An inerteen-filled transformer (750 kv.-a.) feeding a control center.



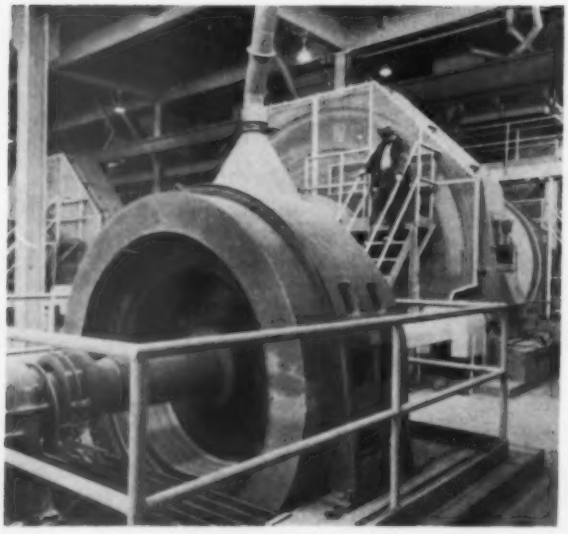
An indoor dry-type, double-ended 480-volt power center, rated 2,000 kv.-a.

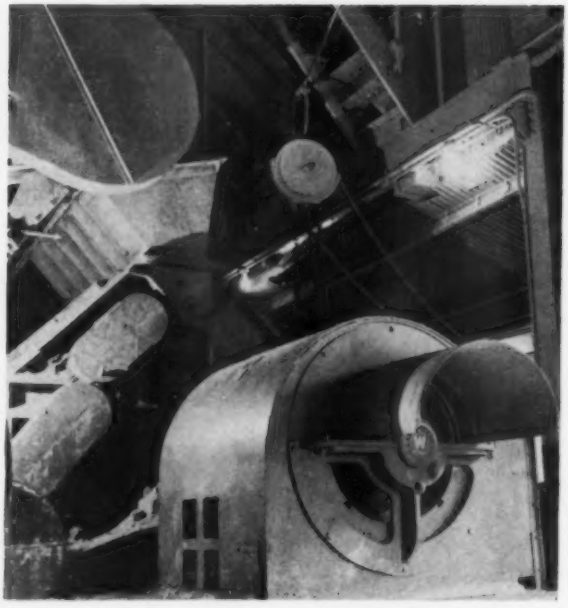
Left: Control centers for auxiliary 440-volt motors.

Right: A portable switchhouse for supplying an electric shovel.

Below, left: A high-torque, synchronous motor drive (1,250 hp.) for a ball mill doing finish grinding.

Below: This hammermill secondary crusher is driven by a 600-hp., 900-r.p.m. synchronous motor.





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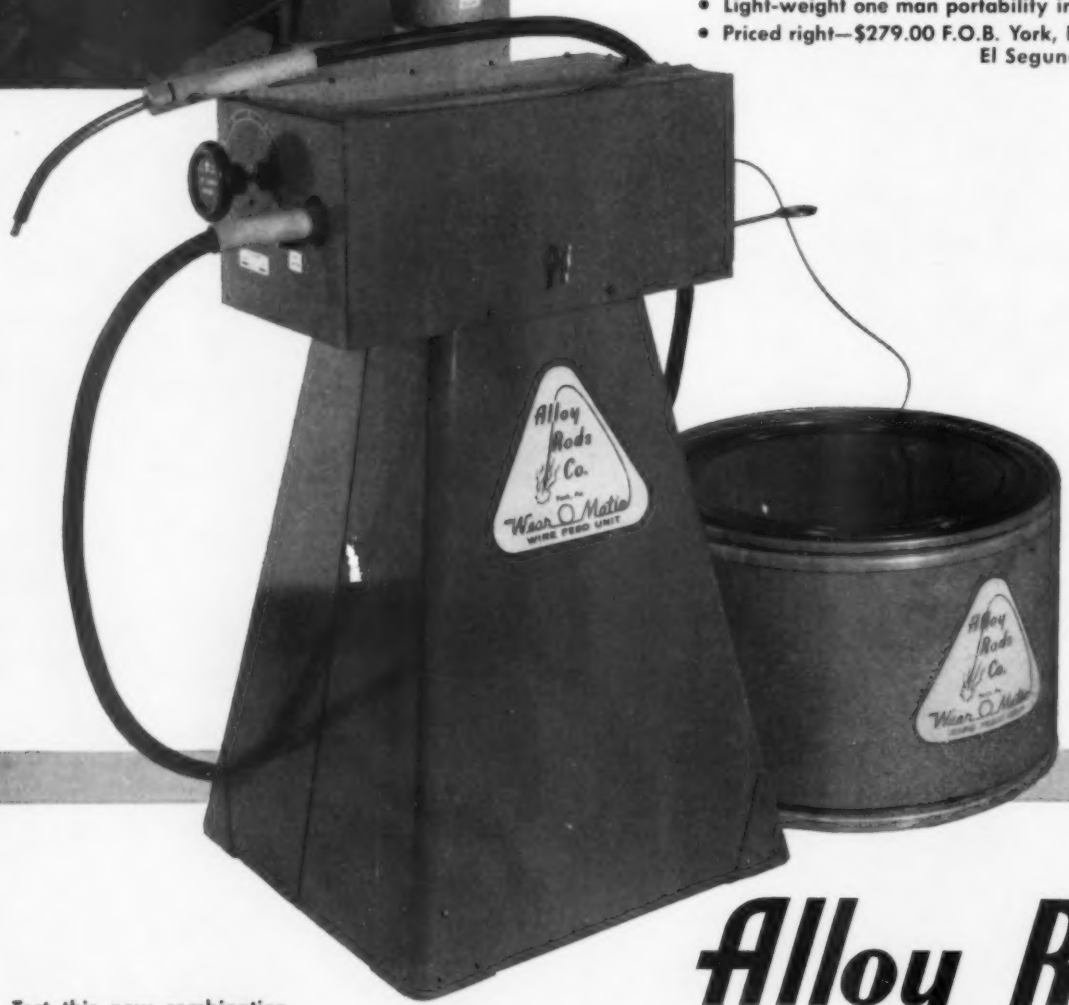

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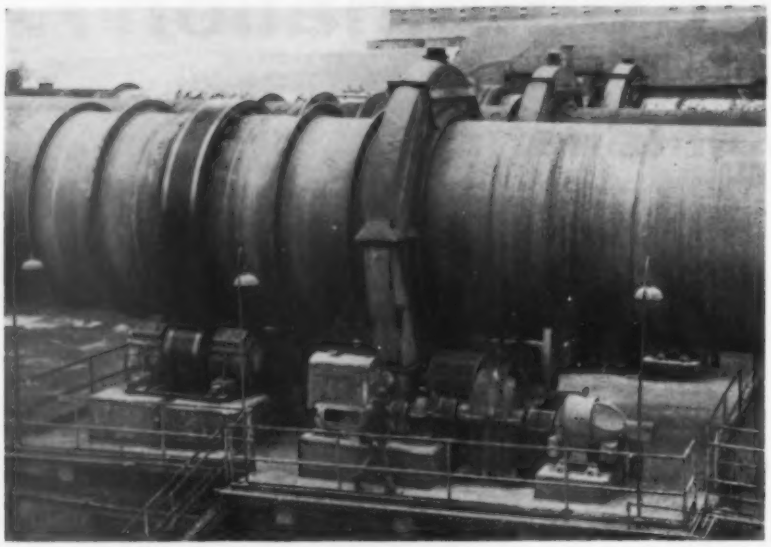

A rotary cement kiln drive with a 125-hp. d.-c. drive motor and auxiliary gasoline engine drive.

seals (flingers) is applied. Special breathers and bearing seals are provided for cement-plant gearmotors.

In d.-c. machine application, machine speeds of 1,200-r.p.m. or lower are preferred to minimize brush and commutator maintenance. The large synchronous pedestal-bearing machines are usually of open construction. Special Neoprene treatment is given to Thermalastic-insulated windings to protect against abrasive dust particles.

Cost per horsepower at different voltages for motors and associated control is shown in Figure 5. A choice of motor voltages based on cost alone would dictate that motors of 200 hp. and above be rated 2,300 volts in preference to 440 volts, and 250 hp. and above be rated 4,000 volts, depending upon the distribution voltage available. Other factors also influence the "break points" in motor voltages. For example, it may not be desirable to run a high-voltage line to motors in certain locations or to have a single motor on a higher voltage. Or the higher motor voltage may be preferred where continuity of service requires independence from power centers.

The power factor of a cement plant is unusually high, close to unity in most plants. The leading reactive volt-amperes supplied by large 80 percent power-factor synchronous mill motors is sufficient to correct the power factor of the numerous induction motors used throughout the plant. Additional power-factor corrective capacitors are rarely required. Cement plant loads, with the exception of the quarry and crushers, are steady loads; and the load factor is relatively high, 80 to 90 percent.

With continuous flow lines so dependent upon successful operation of electrical equipment for continuity of operation, cement plants have established effective preventive maintenance programs. Regularly scheduled checks of machinery, tabulations of machine operating records, and an adequate supply of spare parts characterize the typical program. From the plant substation to the shipping platform, electrical supply and drive systems are safeguarded to provide flexibility, continuity of service, and safety.

Typical Cement Plant Drives

Machine	Horsepower	Motor Type	Control
Gyratory, Roll, Jaw } Crusher	75-400	Wound Rotor	Magnetic secondary
Cone Crusher	50-300	Squirrel Cage NEMA B Spcl.	Full voltage
Hammermill	150-600	Squirrel Cage	Full voltage
Impactor		Synchronous	Full voltage Sometimes reversing
Conveyors	3-60	Squirrel Cage	Full voltage
	60-300	Wound Rotor	Magnetic secondary
Ball Mills	450-2000	Synchronous	Full voltage on low-speed motors, reduced voltage on high-speed motors
Kiln Drive	75-250	D.-c. Stab. Shunt	Adjustable-voltage multi-motor drive, sometimes 8:1 speed range
Feeder	5-15	D.-c. Stab. Shunt	
Air Separators	50-200	Squirrel Cage NEMA B or C	Full voltage
Draft Fans	40-600	Squirrel Cage NEMA B Spcl. Synchronous Wound Rotor	Full voltage, sometimes speed control
Coal Crusher	40-200	NEMA B Spcl.	Full voltage
Cement Cooler	40-100	NEMA C	Full voltage
Elevators Screw Conveyors Drag Chain	10-40	NEMA B or C	Full voltage
Bucket Cranes	40-200	Wound Rotor Adjustable voltage D.-c. hoist drive	Secondary resistance Definite time acceleration Current limit acceleration Magamp Rototrol

IT COSTS NO MORE — TO USE THE BEST

REPLACE WITH

"Indian Brand"

MANGANESE STEEL
Shovel Dippers
Dipper Teeth
Shovel Treads

Crusher Jaw Plates
Mantles—Concaves
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Pulverizer Hammers
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Ball Mill Liners
Screen Plates

The Frog, Switch & Mfg. Co. CARLISLE, PA.

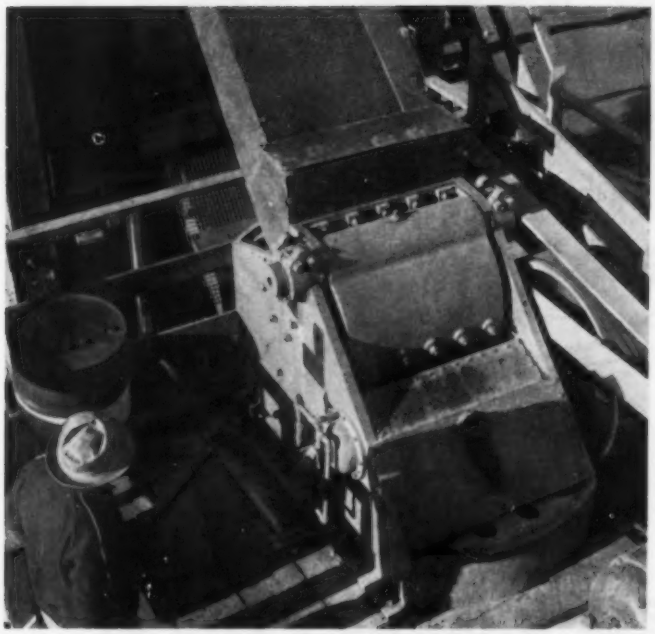
ESTABLISHED 1881

Enter 96 on card, page 167

Zone _____ State _____

AT LEAST 5 TIMES LONGER JAW PLATE LIFE ON HARDEST ROCK

. . . "crushing without rubbing" principle of KUE-KEN® CRUSHERS eliminates abrasion—the main cause of jaw plate wear

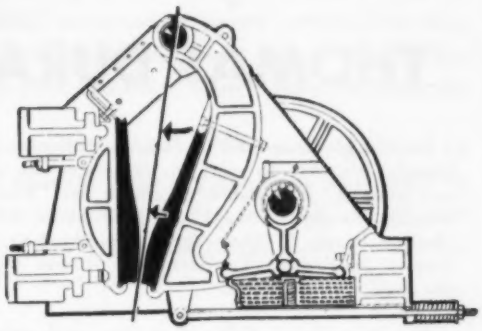


36" x 10" Kue-Ken crushing extremely hard gravel. This operator installed a duplicate Kue-Ken in another plant.

Kue-Ken eliminates a major expense in jaw crusher operation . . . frequent jaw plate replacements. Unlike all conventional crushers, where some of the jaw plate is rubbed away with every crushing stroke Kue-Ken crushes without rubbing by gripping the rock squarely and crushing without upward or downward action. Jaw plates last at least 5 times longer saving replacement cost and frequent production losses from downtime. Also, Kue-Ken is the only crusher that eliminates shutdowns caused by rapid wear through dirt and grit in the operating mechanism. It has a crankcase-type lubrication system with all mechanism operating in a sealed bath of clean, filtered oil. Overload cannot damage Kue-Ken . . . safety device instantly releases flywheel. Automatic pressure switch sounds alarm or stops motor.

Kue-Ken crusher size	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	5"	6"	Horsepower range
24" x 12"	22	26	32	36	43	50	56					15 to 30
30" x 12"	32	35	38	42	55	70	76	85	110			20 to 30
36" x 10"	38	47	57	67	80	91	105					25 to 40
36" x 20"					70	82	90	115	135	160		30 to 50
42" x 25"					90	120	150	165	180	215	250	40 to 60

- Table of tons per hour that will pass through crusher with jaws set at dimension shown when measured in the closed position.
- Table is based on crushing average hard, dry quartz or similar rock weighing at least 100 lbs. per cubic foot when crushed.
- 32 sizes available from 12" x 5" to 48" x 42"



Jaw plates last at least 5 times longer . . . only Kue-Ken crushes without rubbing.

See how the hinge pin is located on the center line of the crushing zone. The jaw moves in an almost straight line. Rock is instantly gripped and crushed without rubbing.

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KUE-KEN® CRUSHERS

"Crushing without Rubbing"

STRAUB MFG. CO., INC. 8386 Baldwin St., Oakland 21, Calif.

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens
Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

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DENVER, COLO. . . . . Union Supply Co.
CASPER, WYOMING . . . . Moss Equipment & Supply Co.
VANCOUVER, B. C. . . . . Universal Equipment Co.

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor, Close Works, Gateshead-upon-Tyne 8, England

Enter 97 on card, page 167

"We Agree on—

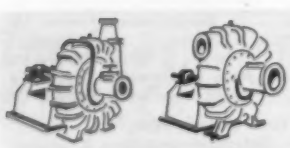
THOMAS DURABLE DREDGE PUMPS!"

In this glorious land of free enterprise and free speech, it's easy to start an argument on almost any subject. A notable exception is: "How Do Thomas Dredge Pump Users Feel About Thomas Dredge Pumps?" They agree it is the best pump they've ever seen. To borrow a phrase, just ask the man who owns one.

We have been doing just that and reporting what they say in our advertising. Here is a recapitulation:

- "YOURS IS A WONDERFUL PUMP—IT IS DOING A GRAND JOB."
- "THE RUNNER LASTS THREE TIMES LONGER THAN PREVIOUS RUNNERS."
- "ITS INSTALLATION HAS BEEN THE SALVATION OF OUR INVESTMENT IN A DREDGE."
- "THE ENGINEERING SERVICE AND TECHNICAL ADVICE GIVEN US HAS BEEN VERY HELPFUL."
- "THE TIME LOST IN DREDGE OPERATION FOR PUMP REPAIR IS SO SMALL IT IS COMPLETELY NEGLIGIBLE."
- "REDUCED THE OVERLOAD ON OUR MOTOR."
- "ASTONISHING DURABILITY."

Each single statement is convincing. Collectively, they add up to this proven fact: YOU CANNOT BUY AT ANY PRICE A MORE DURABLE PUMP FOR SAND AND GRAVEL—YOU CANNOT BUY ANOTHER PUMP THAT WILL MAKE YOU AS MUCH MONEY. Write for details, and free literature.



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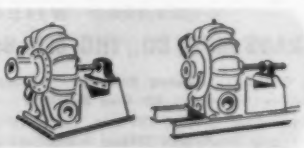

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Review and Forecast

While there was some slackening off in the rapid upward climb of demand for PIT AND QUARRY materials, it seems certain that they set another new record in 1957. Portland cement was off slightly, aggregates at least held their own, and many other nonmetals were up.

Prospects for 1958 are good. Construction volume is expected to continue upward, and the Federal Highway Program will begin to make itself felt. Aggregates are expected to set new highs, cement will regain lost ground, and the PIT AND QUARRY industries as a whole are expected to set a new record.

Pit and Quarry reports:

Construction Continues Climb ..... p. 100
—JAMES G. KOSTKA

Cement Production, Shipments Down in 1957 107
—WALTER E. TRAUFFER

Aggregate Industries in Healthy Condition 122
—BUREN C. HEROD

Other Non-Metals Keep Record Pace 130
—BUREN C. HEROD

Special Reports on the Concrete Industries, by ROY L. PECK, are featured in our MODERN CONCRETE for January, 1958.

Review and Forecast

Construction

Continues Climb . . .

Higher Volume Expected in '58

By JAMES G. KOSTKA

EVEN though the final construction figures for 1957 were not yet available at this writing, it is generally conceded that the total value will be about $47.2 billion, an increase of 2 percent over 1956. This will make 1957 the 12th consecutive year in which a construction record has been set. Actually, the record represents a new high only in construction dollar volume, resulting from higher labor and material costs. Physical construction, it is felt, remained at virtually the same record level reached in 1956.

Looking into the future, the general concensus is that outlays for new construction will total $49,600,000,000 in 1958. This is an increase of 5 percent above the record expenditure of $47,200,000,000 anticipated for 1957. Also, this rate of dollar outlay would probably mark 1958 as the second-highest year in the physical volume of work put in place. This conclusion is reached by adjusting expenditures to price changes that have taken place and are expected to take place this year. Only the year 1955 would remain higher. In addition to the $47,200,000,000 in new construction performed in the continental United States in 1957, another $18,000,000,000 in maintenance and repairs took place, bring all construction to a grand total of $65,200,000,000. This is an increase of 3 percent over the total construction experienced the previous year. All construction in 1958 is expected to reach $68,000,000,000, about $18,400,000,000 coming from maintenance and repair and the remaining $49,600,000,000 from new construction.

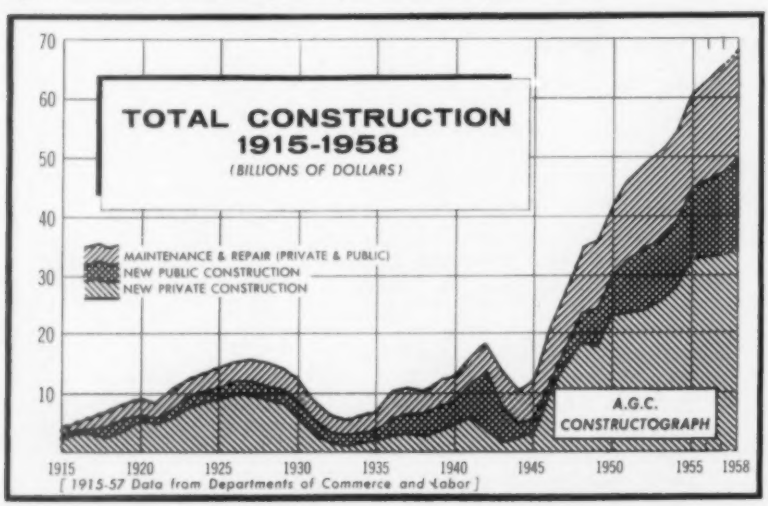
Most of the $2,400,000,000 gain in 1958 construction is expected to come from residential building, both private and public, and from highway work. The combined gain of this group is expected to account for approximately $2,100,000,000. Expenditures for almost all other major types of construction will probably rise moderately or remain close to the 1957 level. The only notable declines anticipated are for private industrial plants and military facilities.

Industry production has been experiencing a leveling-off for a number of months; therefore, it is quite logical to assume that fewer plants will be expanded and a smaller number of new plants will be built in 1958.

Military facility construction is expected to drop for several reasons. One of the reasons is an economy-minded Congress that has been cutting military expenditures at every opportunity during the regular session. Another reason is that we are in the very early stages of a transition from our old concept of military installations to a new one dealing with rockets, guided missiles, satellites, and other weapons of the future. Considerable planning has to be done before we will become involved in this type of construction to any great extent; but once we start building this type of operation into our national defense, it should have considerable impact on the construction picture. The urgency of the need for military facilities of this type are already apparent, but it probably will not be until a year or two from now that this need will materialize in actual construction projects of any great importance.

Highway construction will certainly be very instrumental in brightening the entire construction picture in 1958, and for a number of years thereafter. With road building starting to move at an increased pace, 1958 highway construction should amount to about $5,500,000,000. This is 14 percent higher than the estimated total of $4,830,000,000

Construction growth has been very rapid during the post-war years, propelled by the enormous needs of an expanding population and economy which were compounded by underbuilding of community facilities during the depression and war years.



produced by this type of construction in 1957.

It is a certainty that the gigantic Federal Highway Program will be felt quite strongly in 1958. Preliminary work dealing with plans and land acquisition is being disposed of more rapidly now; consequently a greater portion of the 41,000 miles of highway to be constructed for this program will be laid in 1958 than in 1957. This will call for increased demands for sand and gravel, crushed stone, cement, and asphalt in the areas where this construction has started.

A reversal of the 1956-57 downtrend of private housing activity is anticipated in 1958. Total expenditure for new private construction is expected to reach $34,700,000,000 in 1958, an increase of $1,400,000,000 over the previous year. Total public construction in 1958 is expected to reach $14,900,000,000, representing an increase of $1,000,000,000 over 1957. Therefore, private construction is expected to outgain public construction by $400,000,000 in 1958.

The expected volume of new construction in 1958 is based on the assumption that any change in the economic pace next year, as measured by national output, income, and employment, will not be great enough to exert a significant push up or down on the total new construction activity. Of course, it must also be assumed that international developments will not affect construction in the continental United States. A major armed conflict, no matter where it might develop, certainly could change the construction picture drastically, and almost over night. The estimates for 1958 construction are also made with the expectation that there will be an adequate supply of materials and labor, and the assumption that construction costs will continue to move in a moderate upward trend, but at a somewhat slower pace than in 1957.

PRIVATE CONSTRUCTION

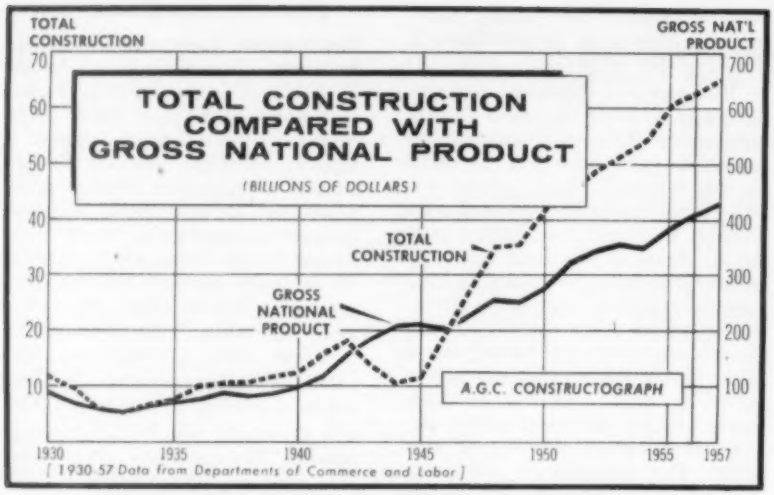
Residential Building Tight money will continue to be one of the chief limiting factors in housing activity in 1958. Some easing of the mortgage market is assumed for 1958, however, in part because of increased savings of the types used for mortgages, and also because investment in home loans should benefit from some tapering off in funds demand for such purposes as industrial plant and equipment expansion. It may be assumed therefore, that a total of about 1,050,000 new nonfarm dwellings will be started in 1958, about 1,000,000 of which will be privately financed. This compares with a probable total of approximately 970,000 private units and about 50,000 public units in 1957.

Another factor that will have a deterring effect on private housing construction is seen in the steadily rising prices that must be paid for

NEW CONSTRUCTION PUT IN PLACE IN CONTINENTAL UNITED STATES 1956, 1957, AND OUTLOOK FOR 1958[1]

Type of construction	Value (in millions)			Percent change	
	1956	1957[2]	1958	1956-57	1957-58
Total new construction	**$46,060**	**$47,200**	**$49,600**	**+ 2**	**+ 5**
Private construction	**33,242**	**33,300**	**34,700**	[3]	**+ 4**
Residential buildings (nonfarm)	17,632	16,530	17,575	— 6	+ 6
New dwelling units	13,490	12,125	12,800	—10	+ 6
Additions and alterations	3,695	3,915	4,250	+ 6	+ 9
Nonhousekeeping	447	490	525	+10	+ 7
Nonresidential buildings (nonfarm)	8,817	9,155	9,150	+ 4	[3]
Industrial	3,084	3,170	2,875	+ 3	— 9
Commercial	3,631	3,585	3,775	— 1	+ 5
Office buildings and warehouses	1,684	1,870	2,025	+11	+ 8
Stores, restaurants, and garages	1,947	1,715	1,750	—12	+ 2
Other nonresidential buildings	2,102	2,400	2,500	+14	+ 4
Religious	768	870	870	+13	0
Educational	536	525	540	— 2	+.3
Hospital and institutional	328	505	590	+54	+17
Social and recreational	275	300	300	+ 9	0
Miscellaneous	195	200	200	+ 3	0
Farm construction	1,560	1,600	1,600	+ 3	0
Public utilities	5,113	5,825	6,150	+14	+ 6
Railroad	427	450	400	+ 5	—11
Telephone and telegraph	1,066	1,075	1,000	+ 1	— 7
Electric light and power	1,845	2,100	2,350	+14	+12
Gas	1,400	1,800	2,000	+29	+11
Other public utilities	375	400	400	+ 7	0
All other private	120	190	225	+58	+18
Public construction	**12,818**	**13,900**	**14,900**	**+ 8**	**+ 7**
Residential buildings	292	505	850	+73	+68
Nonresidential buildings	1,072	4,470	4,710	+10	+ 5
Industrial	453	455	450	[3]	— 1
Educational	2,549	2,830	3,000	+11	+ 6
Hospital and institutional	298	330	340	+11	+ 3
Administrative and service	362	430	470	+19	+ 9
Other nonresidential buildings	410	425	450	+ 4	+ 6
Military facilities	1,395	1,275	1,100	— 9	—14
Highways	4,470	4,825	5,500	+ 8	+14
Sewer and water systems	1,275	1,345	1,270	+ 5	— 6
Sewer	701	785	750	+12	— 4
Water	574	560	520	— 2	— 7
Public service enterprises	384	395	400	+ 3	+ 1
Conservation and development	826	965	950	+17	— 2
All other public	104	120	120	+15	0

[1] Joint estimates of the Department of Labor and the Department of Commerce.
[2] Last 2 months estimated.
[3] Change of less than one-half of 1 percent.



The trend of construction toward a larger share of the gross national product since World War II is graphically shown here. Slight dips in the economy in 1949 and 1954 had a relatively small effect on total construction volume.

structures of this type. Many prudent men are beginning to think twice before they are willing to be tied down with an exceptionally large mortgage, even if the money is available. Many men already feel that the prices of houses are too high and are content to wait and see whether the prices will start to decline.

Figuring the past, present, and future new dwelling construction on a dollar basis, the 1957 dollar value is estimated to be $12,100,000,000, compared to $13,500,000,000 for 1956. The 1958 figure is expected to rise to $12,800,000,000, or an increase of about 6 percent over the 1957 figure.

The number of new private units expected to get under way in 1958 represents a larger increase from 1957 in the number of apartments to be started than in single-family houses, continuing the decided uptrend in multifamily residential building which began early this year. It is likely that apartment units will constitute almost one-fifth of the total housing starts in 1958, the largest proportion since 1949, when apartment house construction was assisted by easy credit conditions and by special financing aids under former Section 608 program of the National Housing Act.

The rising rate of rental-type building at present may be attributed to a number of influences, including expanding programs for rebuilding urban centers; anticipation of greater returns on rental investments; and a large core of demand for convenient, urban locations from the fastest growing adult segments of the population, made up of young couples without children and elderly people who have a desire to be near the center of activity.

Additions and Alterations The addition and alteration market is a rather difficult one to figure, mainly because there is no way of making a direct check on it. Many of the operations that are eventually reflected in the total dollar volume are due to do-it-yourself home owners. Because of this fact, this market has to be estimated. The joint estimates of the Department of Labor and the Department of Commerce indicate that this type of construction will account for $4,250,000,000 in 1958. In 1957 it amounted to $3,920,000,000, so an increase of 9 percent is expected in 1958.

Experience has shown that when new private housing construction falls or remains relatively stationary, the addition and alteration segment of housing construction rises. The opposite is true when private housing construction shows a marked increase; addition and alteration construction falls off during this period.

Nonresidential Construction Combined in this group are industrial buildings, warehouses, stores, restaurants, garages, religious buildings, hospital and institutional buildings, social and recreational buildings, and privately owned post office buildings, comfort stations, rest rooms, fire stations, zoo buildings, animal hospitals, private garages, greenhouses, aircraft hangars, and a number of other nonresidential buildings. As a complete group, nonresidential buildings, excluding the farm type, were responsible for $9,150,000,000 in construction in 1957. This was an increase of 4 percent over the previous year. In 1958 the construction dollar volume for this group is expected to remain virtually the same as the preceding year.

Breaking the large nonresidential group into sub-groups, we can get a clearer picture of what was done by these individual groups in 1957 and what is anticipated in 1958. Industrial construction, which represented $3,170,000,000 in construction in 1957 is expected to be about $2,880,000,000 in 1958, a drop of 9 percent. On the other hand commercial construction, representing office buildings, warehouses, stores, restaurants, and garages is experted to rise 5 percent in 1958. The construction dollar volume for this group was $3,590,000,000 in 1957 and is expected to climb to $3,780,000,000 in 1958.

The third sub-group making up the nonresidential group consists of other nonresidential buildings. Included in this type of construction are religious, educational, hospital, and institutional, social and recreational, and miscellaneous buildings. In 1957 this group accounted for $2,400,000,000 in construction, an increase of 14 percent over the previous year. In 1958 the construction volume in this group is expected to rise to $2,500,000,000, an increase of 4 percent over 1957.

Farm Construction Farm building construction is expected to level off from the upward trend it has been experiencing in the last two years. Construction in this category was $1,600,000,000 in 1957, an increase of 3 percent over the previous year. But 1958, it is felt, will be just about the same as 1957 in construction needed by this group. Farm population has remained comparatively static for a number of years; consequently there has been just a normal amount of this type of construction.

Public Utilities Making up the public utility group are the railroads, telephone and telegraph services, electric light, power, and gas companies, and related services. As a combined group, public utility construction amounted to approximately $5,830,000,000 in 1957, a whopping 14 percent above

the 1956 total of $5,110,000,000. Construction attributed to this group is expected to reach $6,150,000,000 in 1958, an increase of about 6 percent over the previous year.

Taking the individual components of the public utility group, railroad building construction is expected to drop 11 percent, from a $450,000,000 total in 1957 to $400,000,000 in 1958.

Telephone and telegraph installations are also expected to drop in 1958. Final construction figures for 1957 for this group should reach $1,080,000,000, an increase of 1 percent over the previous year; but it is felt that the 1958 total will only reach $1,000,000,000, a drop of 7 percent.

Electric light and power plant construction has shown a spectacular climb for the last several years, going from $1,850,000,000 in 1956 to $2,100,000,000 in 1957, when a decline of 6 percent had actually been forecast for the 1957 total. Moreover, 1958 is expected to reflect a continued climb in this type of construction, and the year should end with a $2,350,000,000 total. This would represent an increase of 12 percent over the 1957 figure.

Construction of gas plants, following a similar pattern shown by electric light and power plants, rose from $1,400,000,000 in 1956 to $1,800,000,000 in 1957, a healthy increase of 29 percent. A further increase is predicted for this group in 1958, when the year-end total is expected to climb to $2,000,000,000. This figure would represent an increase of 11 percent over the previous year's total.

All other public utility construction not mentioned above is expected to remain at the same level in 1958 that it attained in 1957, when it rose to $400,000,000 This figure was $375,000,000 in 1956, giving 1957 an increase amounting to 7 percent.

The final group making up private construction is called "all other private." This is a sort of catch-all group that represents any private construction which does not fit into any of the categories mentioned previously. Although this is a relatively small group, it has shown appreciable gains during the last two years. And indications are that it will continue to make a healthy gain in 1958. The dollar construction volume of this group was $120,000,000 in 1956; in 1957 it jumped to $190,000,000, an increase of 58 percent; in 1958 it is expected to reach $225,000,000, 18 percent higher than last year's total.

PUBLIC CONSTRUCTION

Residential Buildings Outlays for public housing next year will probably climb to a record $850,000,000, chiefly to put in place the sharply rising number of armed service units that had been getting under way in 1957. Public housing starts about doubled in 1957, as compared with the year before, bringing the 1957 total up to $505,000,000 from $292,000,000 the previous year. The 1957 gain amounts to a remarkable 73 percent. Another sizable gain is expected in this type of construction in 1958, when public housing is expected to be 68 percent higher than it was in 1957, a year that showed a spectacular climb over the year preceding it.

Nonresidential Buildings Making up this combined group are the following smaller groups: industrial, educational, hospital and institutional, and other nonresidential buildings. This group, as a whole, represented $4,470,000,000 in construction in 1957, a rise of 10 percent over 1956. In 1958, construction in this group should reach $4,710,000,000, according to estimates submitted by the Departments of Labor and Commerce. This increase, percentagewise, would match the increase of 5 percent expected by the entire construction industry.

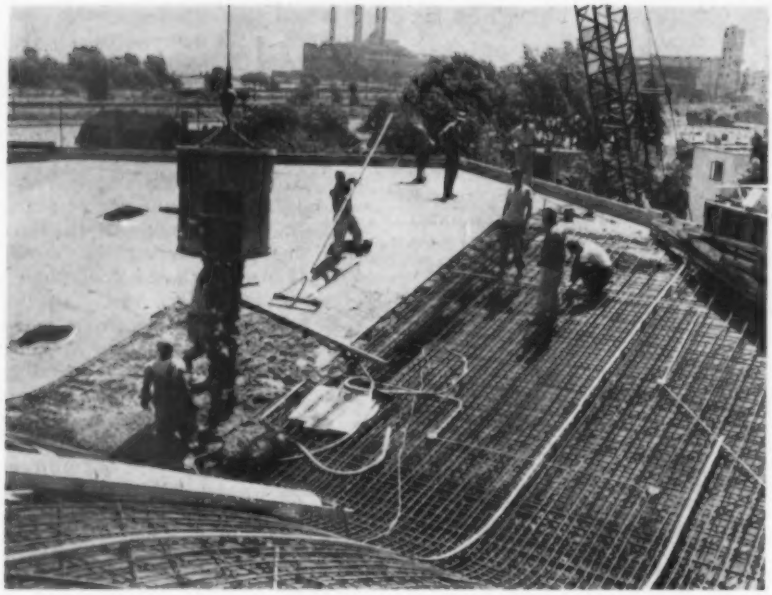
Industrial nonresidential building construction has leveled off and remained on approximately the same plateau for the last two years. In 1956 and 1957 this segment of construction in the nonresidential building group represented an annual dollar volume of about $450,000,000. No important change is expected for 1958.

Construction of educational buildings has continued on a regular upward trend for a number of years. Large numbers of children resulting from marriages during the World War II period caused considerable overcrowding of school facilities early in the 1950's. Steps were taken to remedy this situation by building additional schools and expanding some of the existing structures; as a result, school construction has risen very steadily since the early 1950's. In 1956 this type of construction amounted to $2,550,000,000. It rose 11 percent, to a total of $2,830,000,000 in 1957. Slowing down in pace a bit, but still producing a better than average increase, 1958 is expected to reach $3,000,000,000 in educational building construction; this is an increase of 6 percent over 1957.

The hospital and institutional subdivision of nonresidential building construction showed an increase of 11 percent in 1957, when $330,000,000 was put in place, compared to $298,000,000 in 1956. Construction of this type is expected to taper off to a 3 percent gain in 1958, accounting for a total of $340,000,000.

Buildings coming under the classification of administrative and service have been experiencing a steady rise in construction during the last several years. Back in 1956 this group had a construction volume amounting to $362,000,000; in 1957 it was $430,000,000; and in 1958 it should reach the $470,000,000 mark.

A modern type roof construction used on new hanger by TWA at Mid-Continental Airport in Kansas City, Mo. The thin shell concrete roof is supported by cables.



Adding to the increase in new educational construction in 1957 was the St. Francs de Sales High School of Chicago, Ill. This picture shows the concrete being poured for the thin shell roof.

This would place the 1958 figure about 9 percent above the 1957 total for construction of this type of building.

All other nonresidential building construction not covered in the groups already mentioned fall into the miscellaneous group called "other nonresidential buildings." This group follows pretty much the same pattern as the other groups in this division, except for the institutional group, which is expected to show a slight decline. From 1956 to 1957 this miscellaneous group climbed in production from $410,000,000 to $425,000,000, an increase of 4 percent. Expectations for 1958 are slightly better. The estimated volume for this group should be about $450,000,000, an increase of 6 percent.

Military Facilities There is an expected decline of 14 percent in expenditures for military facilities, bringing the 1958 total down to $1,100,000,000. This is the continuation of a decline started in 1957, and reflects both reduced appropriations and completion of many support facilities begun under the two-year expansion in 1955 and 1956. However, if the rocket and guided missile program should suddenly develop into a crash program proposition, it is conceivable that much of the 14 percent drop anticipated by this division of construction could be wiped out in a relatively short period of time.

Sewer and Water Systems Construction of both sewer and water works is expected to decline next year in response, to some extent, to the drop in residential construction since 1955. In the case of sewer facilities, the 4 percent drop which seems likely represents the first reversal of a steady upward trend since 1945, whereas the 7 percent decline in outlays for water works construction continues the downward trend begun in 1957.

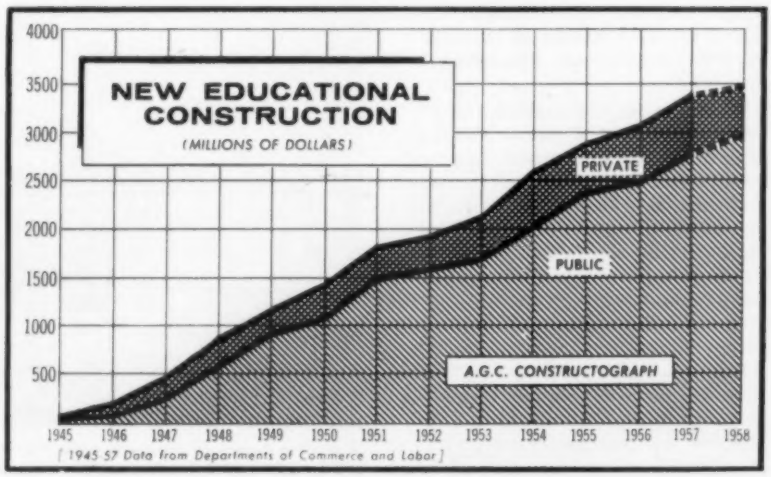
Although sewer and water system construction is expected to decline in 1958, its $1,270,000,000 volume will still be close to record $1,350,000,000 estimated to have been spent on this division in 1957.

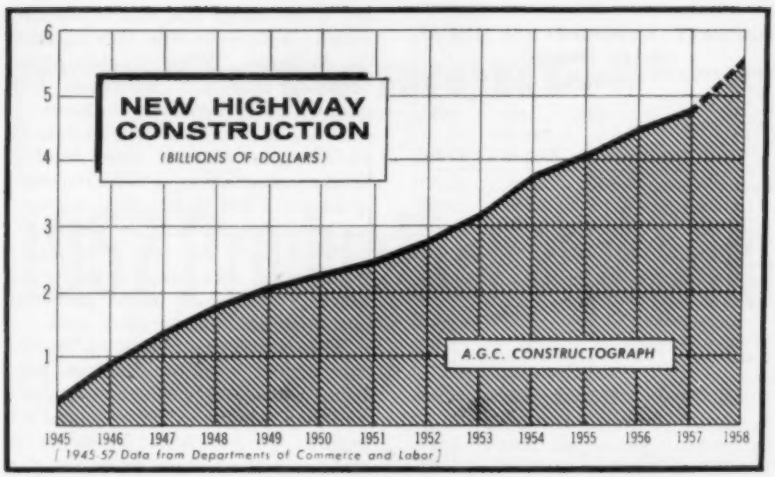
Public Service Enterprises A good portion of the public service enterprise group is made up of power plants. New records in construction dollar volume were established by this group in 1956, when $384,000,000 was spent, and again in 1957, when an estimated $395,000,000 was spent. Another link in the chain of records should be added in 1958, when production in this group should hit $400,000,000. Although each rise has been relatively small, a new peak was reached in each of the last two years, and another new one is predicted for 1958, when public service enterprise construction should be 1 percent above the 1957 figure.

Conservation and Development Conservation and development programs are likely to continue at about the record 1957 rate, as gains in Corps of Engineers and Bureau of Reclamation programs are offset by a drop in activity on the St. Lawrence Seaway, on which peak construction is now past. Although few large Corps of Engineers projects have been authorized to be started in 1958, a number of sizable programs begun in previous years, some multipurpose projects, and others for flood control or navigation alone, will be reaching peak construction levels this year.

On the other hand, increasing expenditures by the Bureau of Reclamation in 1958 will result from work on the early stages of two new

The relentless pressure for schools should push educational construction upward, with possibly 73,000 classrooms provided in 1957-58 school year.





Highway construction should show the first big spurt under the impetus of the long-range program this year as a tremendous backlog of interstate projects in the planning stage is readied for contract.

projects . . . the Glen Canyon Dam (key structure in the upper Colorado River Storage project), and diversion of Trinity River waters into the Sacramento River.

All Other Public Construction This is the smallest of any of the construction groups designated in the list put out by the Departments of Labor and Commerce. Actually, its main purpose is to pick up all public construction not specifically listed elsewhere. In 1956 this group was responsible for $104,000,000 worth of construction. Climbing sharply in 1957, construction by the group amounted to $120,000,000, a gain of 15 percent. The 1957 level is expected to be maintained in 1958; therefore, a volume of about $120,000,000 is anticipated.

HIGHWAY CONSTRUCTION

Highways represent the largest segment of public construction operations. It is surpassed only by construction of residential buildings, nonresidential buildings, and public utilities in the private construction field. A good illustration of its importance can be gained by noting its impact on the entire construction market. In 1956 highway construction represented 9.7 percent of the entire construction market; in 1957 it was 10.2 percent, and in 1958 it is expected to jump to 11.1 percent, due to the Federal Highway Program's ability to show some definite progress.

By August, 1957, $6,550,000,000 had already been appropriated under the Federal Highway Act of 1956. This represents more Federal Funds than were appropriated for the states under all of the six previous Federal Aid Acts for the fiscal years 1946 through 1957. But even with this large allotment of funds, many people feel that the present highway program is extremely slow in getting under way.

An explanation for this so-called slow start is provided by Burton F. Miller, deputy executive vice-president of the American Road Builders Association. He points out that all major construction jobs require certain essential preliminaries before actual construction operations start. This is the reason why some of the anticipated rise in demand for construction machinery, aggregate, asphalt, cement, etc., has not been felt too strongly as yet.

In relation to dollars, the expansion of the highway program is very close to being on schedule. The Bureau of Public Roads set a goal for fiscal year 1957, which ended June 30, of about $2,230,000,000 in Federal funds to be used for highway projects. By that date the actual obligations were about $2,220,000,000.

During the fiscal year 1956-57, $538,000,000, or roughly 40 percent of the total amount allotted, was used to pay for preliminary engineering and right-of-way costs, leaving only a little over 60 percent for actual construction operations.

Viewing the highway program from a geographic point of view tends to reveal a distorted and unbalanced picture of what is taking place. Some states are doing what appears to be a very great amount of work, while others seem to be doing virtually nothing. There are several valid reasons for these geographical differences.

When the Highway Act was signed into law in July, 1956, some of the states were far more ready than most of the others to move into the new road program. Because of this fact New York and California, with revolving funds for advance purchase of right-of-way, and much advance planning, were ready to start; Maryland, with a 12-year

Indiana's new turnpike, near Angola, showing widely separated lanes of opposing traffic and wide shoulders along each lane. These safety features are being built into all modern highways.

highway program already planned and started, could also begin promptly; and in Michigan and a few other states engineers could pull down already completed plans—in some cases even right-of-way acquisitions—and go to work. Naturally, this situation put these states far ahead of the majority that were just beginning their planning. Many states had no plans at all—or at least very few—for a variety of reasons that included politics, lack of engineering personnel, and a lack of funds.

Therefore, when the big new highway program started rolling, the largest initial advances were made by the states that had the staffs, the plans, and the money. Most of the rest had to begin at the beginning, the planning stage.

Because highway contractors now own equipment with a capacity for around $5,000,000,000 in highway construction contracts, no large-scale expansion of these fleets can be anticipated until late in 1958. Earlier expansion was needed in sand and gravel, crushed stone, cement, and asphalt plants, however, and these are ahead in the process of building and expanding to meet the increasing demand for their products which is already being felt in some sections of the United States.

Highway departments, with the assistance and encouragement of the Bureau of Public Roads, are making an all-out effort to expedite the completion of highway construction. New techniques, including wider use of photogrammetry and electronic computers, are being employed with gratifying results to speed up highway engineering and reduce lead-time between programming and the award of contract for highway construction. New and faster procedures are being adopted in the preparation and reproduction of plans to get them to the contractors. Specifications are being revised to require results rather than detailed methods of construction, so that contractors will be able to excercise their ingenuity and use modern, efficient equipment. These are just a few of the improvements that are being made by highway departments to overcome some of the bottlenecks cited in the Task Force Reports as possible obstructions to expansion of the highway program. Progress to date has been very encouraging.

Road builders themselves have been told that they can play an important role in reducing obstacles which might hinder progress toward the maximum expansion of the highway construction program. As responsible members of their communities, they can take the leadership in explaining to their fellow citizens the long-range benefits that will accrue to all through the successful completion of this highway construction program. Lack of understanding on the part of many, and strong opposition on the part of a few selfish and short-sighted people are hampering the efforts of highway engineers in getting many projects into the construction stage.

HIGHWAY EXPENDITURES FISCAL YEARS 1955-1957
(Millions)

	1955	1956 Preliminary Est.	1957 Forecast
Capital Outlay	$4,323	$4941	$5,770
Maintenance	1,872	1,970	2,044
Administration	306	335	350
Highway Police	132	147	154
Interest	271	309	318
Total direct expenditures	6,904	7,702	8,636
Obligations Retired	412	423	462
Grand Total	$7,318	$8,125	$9,098

Published by National Highway Users Conference. The Capital Outlay figure includes both construction and acquisition of right-of-way.

Hearings are being held all over the nation so that persons interested in federal aid projects may have an opportunity to express their views. By actively participating in these hearings, road builders will be able to bring to the attention of those concerned the fact that the long-range benefits from improved highways far outweigh the temporary inconvenience to a few.

The businessman should be reminded that raw materials and his products will move to and from his establishment more quickly, more efficiently and more safely over the new roads, bringing savings in transportation costs. Sales area will increase too, because customers can reach business locations more rapidly from greater distances.

New and modern highways, with their wide rights of way and controlled access, give long-range stability to businessmen who build close to them. Where businesses were built on the right of way, as they are in the case of older highways now in existence, the marginal friction caused by vehicles entering and leaving at random decreased the highway capacity and hastened its obsolesence. Intersections at grade further slow traffic, often necessitating traffic lights and other controls, which in turn reduce the capacity of the road. When reconstruction becomes necessary, businesses frequently suffer by having to move.

In other instances, construction of an alternate route is more feasible than reconstruction, which frequently means a loss in potential customers to businesses along the old route. Stability along the right of way also makes these areas more desirable as homesites, bringing more potential customers into the business area.

This is one example of an important service road builders can perform which will benefit the road-building industry as a whole, and especially the contractor, by aiding in the removal of obstacles to the expansion of the highway construction rate.

Indications are that Congress will have before it many major legislative proposals which undoubtedly will result in pronounced changes in the long-range aspects of the highway program. In fact, the program for 1958 might be substantially adjusted, depending upon just what action is taken by the next session of Congress, which convenes in January, 1958. While it is next to impossible to predict just what disposal Congress will make of the many legislative problems, it is quite reasonable to assume that the highway laws which will be passed this year will have a direct bearing on the rate of construction activity, both immediate and future. It will also be an important support to the economy of this country. Construction represents a substantial segment of our national economy, and highway construction accounts for a good portion of our total volume; therefore, highway construction is very important to the construction picture as a whole as well as the overall economy of the United States.

Officials of the Bestwall Gypsum Company, Ardmore, Pa., have announced plans for the construction of a multimillion-dollar plant at Savannah, Ga. The new plant is the first phase of an expansion program which will include several production facilities on the East Coast of the United States and the opening of ore deposits in Canada.

Lambert Bros. Inc., Knoxville, Tenn., has acquired the Franklin Limestone Company, Inc., of Nashville. The transaction involved equipment and quarries at Antioch, Franklin, and Waverly, Tenn., and Smithland, Ky.

Review and Forecast

Cement

1957 Production and Shipments Down

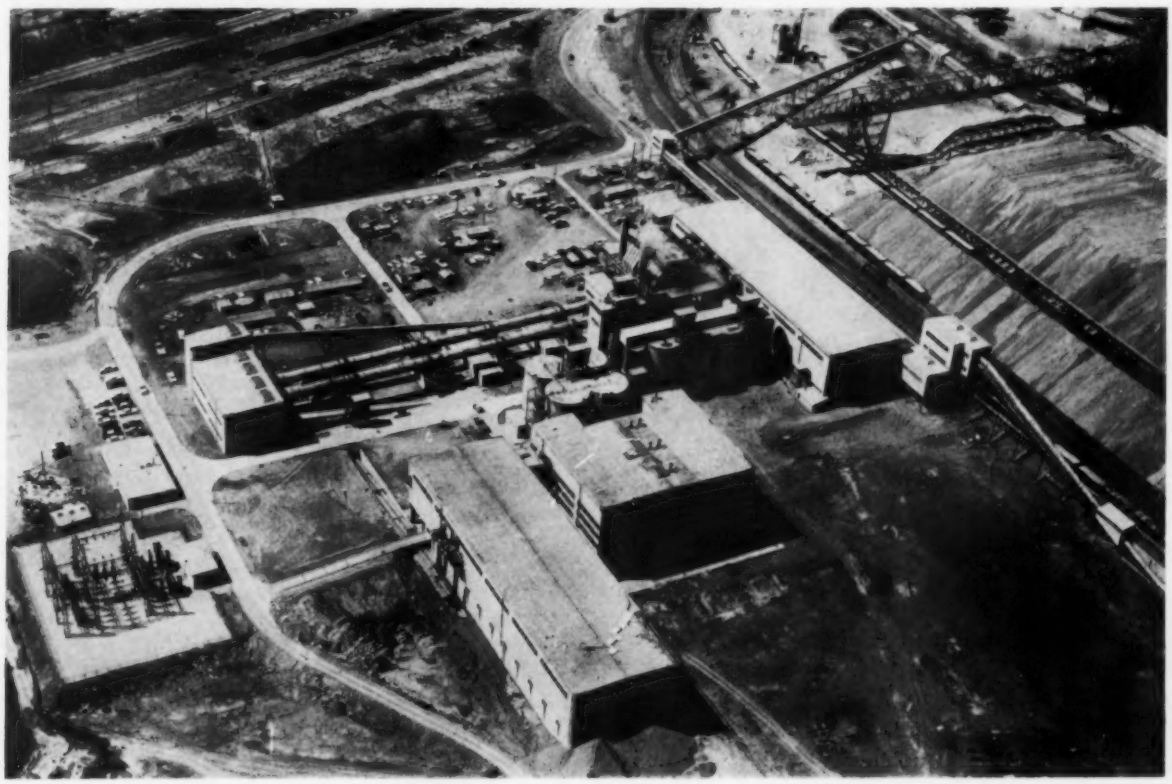
Moderate increase expected in 1958—Capacity far ahead of demand

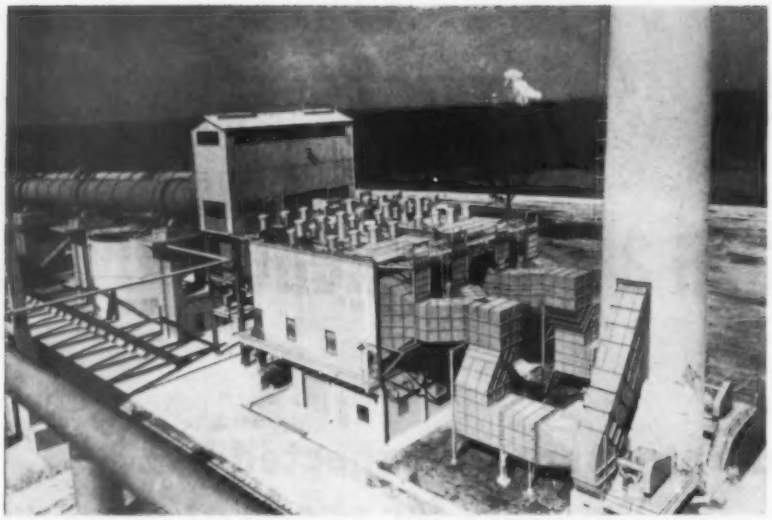
By WALTER E. TRAUFFER

THE portland cement industry in 1957, for the first time in 11 years, failed to set a new all-time record in production and shipments. In fact, in these two categories 1957 not only fell below 1956 but may also have fallen slightly below 1955, making it only the third-best year in history. Official government figures are now available for only the first 10 months of the year; but, with conservative estimates for the last three months, we believe the following totals for the year to be fairly accurate. We estimate that portland cement production in 1957 was about 300,000,000 bbl. and shipments about 293,000,000 bbl. The value of shipments probably set a new all-time record only because of substantial price increases during the year.

There was a decrease of about 5

The new 3,000,000-bbl. plant of the Universal-Atlas Cement Co. at Buffington, Ind., which went into operation late in 1957. Stockpile of limestone (at right), received by boat, also supplies the older plant there.





The two 11-ft. 3-in. by 400-ft. kilns, dust collectors, and stack at the new 2,000,000-bbl. wet-process plant of the Lone Star Cement Corp. at Lake Charles, La.

percent in production and 5 percent in shipments and an increase of perhaps 2 or 3 percent in value of shipments from the 1956 all-time record totals of 316,438,000 bbl., 308,678,000 bbl., and $940,020,000, respectively. This compares to increases of about 6 percent in each category a year ago. The drop in demand in 1957, accompanied as it was by the biggest capacity increase in the history of the industry, had at least one beneficial result in that it ended the recurring shortages of cement which had held down construction in recent years. Actually, there were some temporary shortages of cement in some areas in mid-year due to the widespread strike of cement workers.

The shipments of cement through October (10 months) of 1957 totaled 251,447,000 bbl., or 1,046,000 bbl. over the output of 250,401,000 bbl. for the 1956 period. Stocks on hand at the end of October, 1957, were 19,207,000 bbl., or 47 percent more than a year ago. The lowest point in stocks is usually reached in October, and it seems now that this will be the highest low in many years. It compares with previous yearly lows of 12,996,000 bbl. in October, 1956, 8,073,000 bbl. in 1955, and the record low of 5,668,000 bbl. in 1948. The cement industry will undoubtedly enter the 1958 heavy construction season with its storage silos full, and the capacity of these silos is also at a new record level. A number of plants have already been shut down temporarily due to full silos, and most of the others will be forced to do so for varying periods before spring.

The most important development of the year was, of course, the drop in demand for cement. Next in line was the all-time record amount of producing capacity which went into operation during the year. Eight new plants and 30 important expansion programs were completed in 1957, at a cost of at least $190,000,000 and representing a total annual capacity of about 38,000,000 bbl. Present indications are that at least seven new plants and 20 important expansion programs will be completed in 1958, for a total of perhaps 27,000,000 bbl. of capacity and about $175,000,000.

According to our estimates, the productive capacity of the industry reached a new high of about 375,000,000 bbl. at the end of 1957. By the end of 1958 it may reach 385,000,000 bbl. As a result of this expansion, the industry in 1957 used only about 81 percent of year-end capacity, compared to about 89 percent in 1956. In 1958 probably about the same percentage of capacity will be used as in 1957.

Prospects for 1958 are definitely favorable, due to predicted improvement in construction volume and business in general. No one is being overoptimistic, however, and an increase to 300,000,000 bbl. in shipments seems to be about as much as anyone expects. This would, of course, be second only to the record 308,678,000 bbl. demand in 1956.

Conditions

Producers in general feel that 1957 was a disappointing year, due to the drop in the demand for cement, but they are far from pessimistic. Demand, they say, was down, but it was still the second-best year in history, and an upswing is expected in 1958. Most producers see no reason why they should change their convictions that we are in a new and higher plateau of growth of our economy.

A large company with plants throughout most of the country says that: "Except for spot shortages of short duration due to the strike, cement has been in ample supply this year. This, of course, is due to a slackening in demand and an increase in productive capacity. Shipments by the industry should approximate 295,000,000 bbl. vs. 309,000,000 bbl. last year. We estimate present capacity at about 365,000,000 bbl., with an additional 25,000,000 bbl. to be in production in 1958 or early 1959."

According to an eastern producer: "The year 1957 was disappointing in our opinion for two specific reasons: First, there was little demand for the greatly increased capacity of cement plants throughout the United States, built primarily to serve the expanded National Highway Program. Second, strikes at cement plants in all sections of the country, if not at every plant, demoralized the construction industry for a period of six weeks in June and July and affected the output of many companies for as long a period as three to four months, in some instances. Practically every company that experienced strike conditions showed serious reductions in their net financial returns for the year."

An eastern Middlewest producer says: "The year 1957 saw a transition from a seller's market to a buyer's market in the cement industry. Lagging cement demand during the past few months has resulted in heavier inventories than had been experienced for many years."

Another in the same general area: "We feel that the general conditions in the cement industry are good. An average of 80 percent of productive capacity has served to stimulate and improve marketing and sales techniques, and to bring the cement companies closer to their customers. Keener competition in the field has aided in the respect that all companies are now 're-grooming' their sales forces and techniques. Emphasis is now back on servicing of accounts and regular field travel in territories."

A producer on the West Coast says: "We realize that in the past few weeks there have been several pessimistic statements made by executives in the cement industry. However, our conception of conditions in our section of the cement

industry is that they are excellent. Nevertheless, there does seem to be a mental attitude on the part of some of the industry people that prevents them from recognizing a good market. Actually, what has happened is that in our section of the cement industry we have changed from a completely sold-out condition to a very good market; for example, our productive capacity . . . will have operated at 90 percent for 1957. . . ."

Prospects

Most of the cement companies answering our questionnaire are moderately optimistic about business conditions in 1958 and definitely so on long-range prospects. There seems to be no doubt in their minds that the slight dropping off in the demand for cement in 1957 was a temporary condition, and that demand will rise in 1958 to make it second only to 1956 in sales volume. Many appear relieved to get out from under a condition of shortages and the accompanying production and customer-relation problems. There is also the feeling that it will be beneficial to the industry to shift emphasis from maximum production to maximum productivity. As one said, the keynote of 1958 will be increased efficiency, resulting in lower production costs and a better product.

A large company operating nationally says: "We expect a moderate increase of about 4 percent in industry shipments in 1958. Although total construction volume may not be appreciably more than in 1957, we believe the number of projects requiring a relatively larger quantity of cement, notably highway and airport paving will be greater. . . . so far as volume is concerned, 1958 will not be the best year experienced by the cement industry but it will be better than any previous year—1956 excepted."

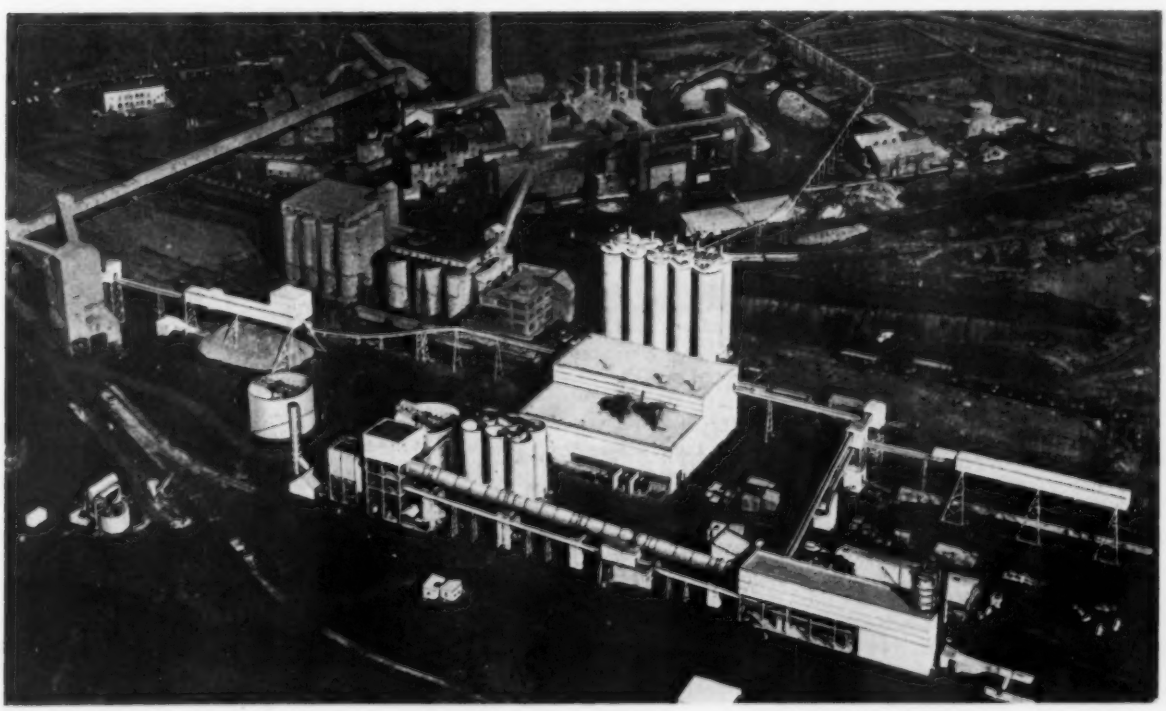
An eastern-southeastern producer says: "We consider conditions in the cement industry, today and for the year to come, to be basically sound. While there is overcapacity in our marketing areas (particularly the Southeast) we do not look upon it as representing any more than coming into a natural balance of supply and demand whereby we probably will not operate in 1958 at full capacity but will be at a somewhat lower but still satisfactory percentage."

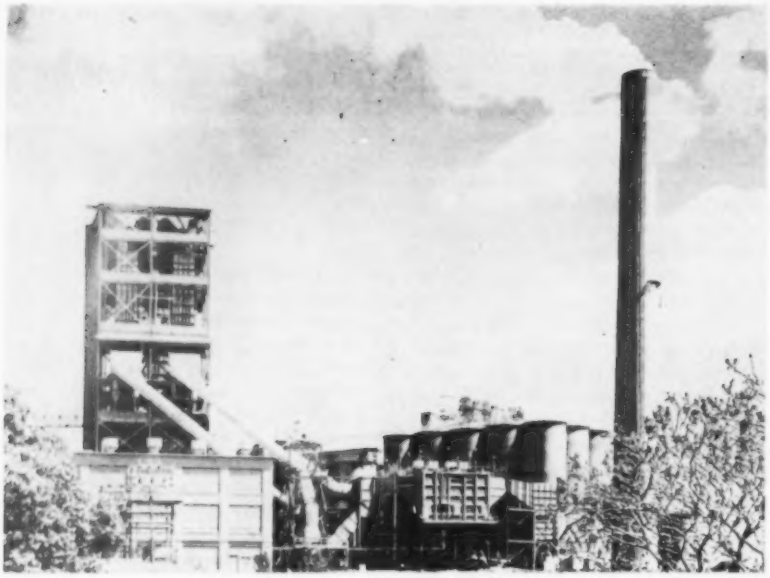
Some pessimism is expressed by a large west-central operator as follows: "Aside from the highway program, it is our impression at this time that industrial construction will be curtailed somewhat in 1958 and possibly in 1959. Capital expenditures by industry have been at all-time highs and there is some evidence that productive capacity is now such that continued outlay of capital for these purposes may decline."

A West Coast producer says: "The coming year brings the promise of intense competition in our section of the industry, with the demand in each geographical area being under that area's capacity to produce. We expect that the industry in the four producing states (Oregon, Washington, California, and Arizona) will average 80-85 percent of capacity for the year. It can be seen how good this will be when it is noted that this production will equal approximately 130 percent of 1955 capacity in these areas. We are expecting our own output to be about 95 percent of capacity."

According to a southern California company: "We are experiencing and expect to experience substantially increased competition in Southern California, with the result that production will probably continue for a period at something less than total capacity. Consequently, increased emphasis is being placed on manufacturing cost reduction. The situation is made no less acute in the

The new 1,250,000-bbl. wet-process plant at Cape Girardeau, Mo., which the Marquette Cement Mfg. Co. built alongside its existing operation there. Equipment includes a 12- by 450-ft. kiln. In this photograph all new construction is light. The pipe in the background leads to new barge-loading silos.





This view of the Boettcher, Colo., plant of the Ideal Cement Co. shows the two new preheater-kiln units with dust collectors and stack (right). Capacity of this plant was increased 800,000 bbl. annually.

face of steadily increasing cost of purchases."

A northern California producer says: ". . . We anticipate continued good business in 1958, but with more and more competition. Our emphasis, therefore, will be: (1) On greatly increased sales effort to try to sell our expanded plant capacity, and (2) On production economy to do everything in our power to manufacture cement more cheaply. We have had outstanding success in using ordinary ammonium nitrate fertilizer as an explosive in our quarries. This has not only been more economical but also safer and more efficient than conventional explosives."

A Pacific Northwest company is brief but definite: "We look forward to another satisfactory year in 1958, comparable in volume of shipments to 1957." It was added: ". . . there is not a substantial overproduction in this area."

Highway Program

Some disappointment was expressed over the fact that the national highway program has not yet materially affected the demand for cement. However, there is full awareness of the fact that the construction of such highways requires a number of preliminary steps which often delay the actual laying of the pavement as much as two years. Some producers do not expect this program to increase materially the demand for cement in their areas until 1959 or 1960.

According to a large company with plants throughout the greater part of the country: "The Interstate Highway Program did not require as much cement as expected in 1957, principally because it was not generally realized how much time is required to complete land acquisition, surveys, design, preparation of plans and specifications, engineering estimates, advertising for bids, and mobilization of work forces. From here on the actual work of laying pavement should proceed much faster and we believe in 1958 consumption of cement for highways will show a healthy increase."

A company in the East Central area says: "The highway program was a disappointment to the cement industry during 1957. Delays caused by right-of-way settlements and acquisitions, engineering, and personnel shortages were the main reasons for failure to surge ahead. However, 1958 should see a strong move to actual work on the roads."

A large company operating plants throughout the greater part of the country reports: "As indicated in our letter of last year, we did not feel that the highway program would bring about much use of cement in 1957 nor in 1958. Our opinion is still that the full impact of the Interstate Highway Program will not be felt in the cement industry until 1959. While there has been much in the news recently about the slowdown in the highway program, we feel that by and large it is pretty well on schedule. The acquisition of rights-of-way, the engineering involved, and the time required to take bids is such that there is bound to be a considerable time lag between the inauguration of the program and the use of cement."

Another California producer says: "The Federal Highway Program in this area has developed at an even slower pace than was anticipated. So far, there has been little cement usage from this source, but some modest increase is expected next year. However, it will be 1959 before we see anything substantial in terms of cement shipments for the Federal Highway Program. The California State Highway budget for the 1958-59 fiscal year is $483,000,000, an increase of 4 percent over the previous year."

A producer in the Pacific Northwest says: "Experience with the Federal Highway Program to date apparently is similar to experience in other parts of this country in that the demand did not meet original expectations. The effect in 1958 is expected to be greater than in 1957."

Important Developments

The really important development of 1957 in the cement industry, according to many producers, was the transition from a sold-out condition and shortages to a very good but competitive market. The seller's market which had existed for ten years changed in January of 1957 to a buyer's market. A refreshing note is the fact that a number of producers are glad to see capacity again ahead of demand and to be again in a position where selling is necessary.

According to an eastern producer: "The most important trend in 1957, as we see it, was the return to conditions where supply and demand were nearly in balance. The only real shortages of cement which developed during the year were temporary ones caused by the work stoppages that were prevalent during the month of July."

In the opinion of a large middlewestern firm: "It now appears that production for the next two or three years at least will be much greater than the ability of the country to consume in spite of the fact that new markets are being successfully developed for cement."

According to a southern California producer: "Of significance in this area was the development of a buyer's market and increasing competition, resulting in greater emphasis on product quality and customer service."

Another West Coast operator strikes an optimistic note when he says that the most important trends in 1957 were . . . "the growing trend toward new uses of concrete, such as prestressed concrete, tilt-up construction, thin shell structures and so forth; improved quality of cement and service to customers; the narrowing of profit margins caused by the continuing increase in labor and material costs without compensating price increases. The effect of these developments and trends on industry is in some cases obvious; there will be a strong trend toward a greater use of cement, as well as a trend toward higher prices."

Industry Problems

The biggest problems facing the portland cement industry in 1957 were, of course, those brought on by the drop in demand, coupled with the tremendous expansion program. These two problems created a large excess of productive capacity. This condition will get worse before it gets better, as a further huge increase in capacity will go into operation in 1958. Some increase in the demand for cement is expected but not enough to keep the excess capacity from increasing. The cement strike in midyear was a handicap to construction in some areas, but no similar problem is expected in 1958.

Producers in general express the urgent necessity to develop their markets to the utmost in order to absorb this excess capacity. There is also some feeling that there is a need for improvement in uniformity of product quality in order to effect economy of production and more efficient utilization of cement. The need for increased productivity —a decrease in man-hours per bbl. produced—and increased fuel and power economy were mentioned by some producers.

According to a middlewestern producer: "With the lessening in demand for portland cement due to a gradual reduction of activity in the construction industry, it would appear that the principal problem facing the cement producers in our area will be sales during 1958."

A California producer says: "We have experienced cost increases concurrently with fairly steady cement prices. We have experienced no shortages of labor or supplies, and no shortage of production capacities. Increasing effort is being directed toward technological improvements in manufacturing methods."

Another West Coast producer said: "We see no particular handicaps to production except for a few older plants with dust problems in residential communities. There have been no shortages due to the increases in capacity in our various marketing areas."

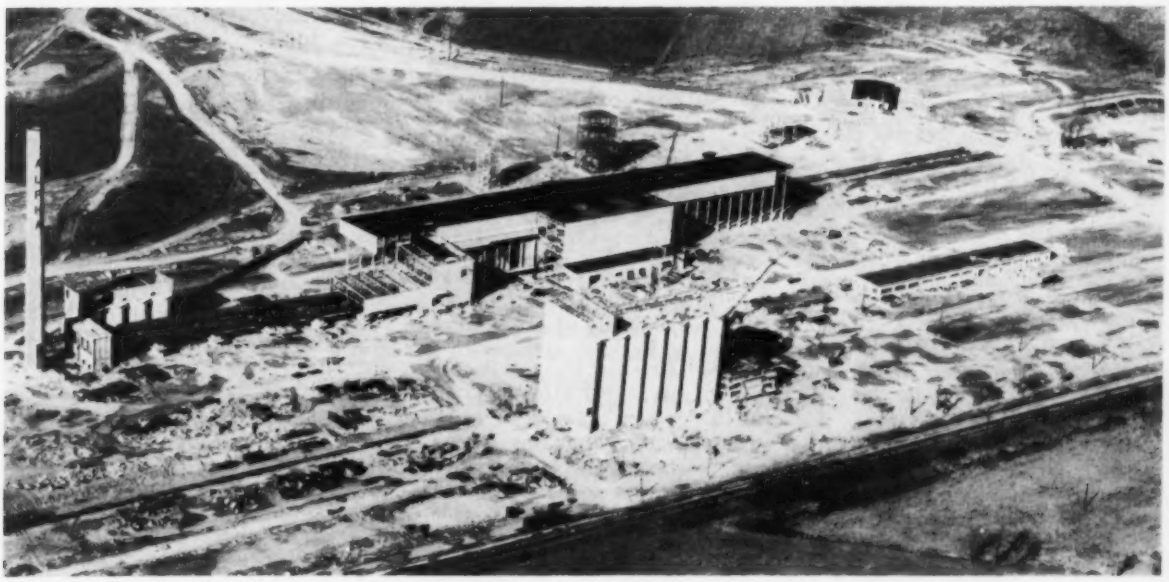
Expansion vs. Economy

There are some rather divergent views as to the effect on production costs of the capacity added at high current costs, in the form of new plants or plant expansions. The general feeling seems to be that even at present reduced capacities the new equipment should make lower costs possible if every possible step is taken to get maximum efficiency and economy. One company says that its creative efforts and capital expenditures have been turned toward effecting new economies in operation. It is felt these efforts should make it possible to maintain or improve the income balance in spite of somewhat curtailed shipments and increasing costs.

A large national producer says: "In our opinion, the cement-making capacity in place and announced is not too great when the future of our economy is considered. The cement industry cannot continue breaking shipping records every year but it must be prepared to satisfy the demand during peak periods, which are sure to occur as our population increases and our national economy advances. Therefore, the capital expenditures which have been made are justified even though total capacity exceeds current demand."

According to an eastern producer: "Cement plant expansion throughout the country may be somewhat slowed during 1958. However, the modernization of plants resulting in increased efficiency and economy of production will justify the expenditures in the return to a buyer's market. The contest for increasing profits out of a more level market should justify the expenditures."

A mid-central producer says: "We do not believe that the increased



The new 2,000,000-bbl. plant of the Alpha Portland Cement Co. at Lime Kiln, Md., which is scheduled for completion in July, 1958. Equipment includes two 11-ft. 3-in. by 400-ft. rotary kilns. With its completion, the combined capacity of the company's nine plants will be 15,000,000 bbl. annually.

efficiency in our new plant will be sufficient to offset the high cost of construction. Figures indicate that the cost of production in the new plant is very close to the cost of production in the 37-year-old plant."

According to a California company: "We are expecting a stretch-out in expansion programs. The ability to operate new units at or near capacity will influence future expansion more than the relative efficiency of new production units given the high fixed cost structure of the industry."

Profits, Prices, and Costs

The amount of information available on profits, prices, and costs is necessarily limited at this time, but there seems to be no doubt that the cement industry in 1957 had another profitable year. Volume of shipments was apparently down about 5 percent from the 1956 record level, but prices seem to have gone up enough to more than offset this. This indicates that the total value of shipments may have set a new record approaching $1,000,000,000, exceeding the previous all-time record of $940,020,000 in 1956.

Costs undoubtedly went up considerably in 1957, as prices of practically everything were increased during the year. Labor costs, in particular, were much higher, especially after the 5-week strike in mid-year. Practically all producers, as a result of this strike, raised wages substantially.

Profits, judging by reports available for the first 6 or 9 months of 1957, were somewhat lower than in 1956. The variation from company to company, however, was considerable. Many reported actual increases in profits, but these were comparatively small. At least as many firms reported drops in profits from 1956, and many of these were substantial. A surprisingly large number of companies showed only minor gains or losses. It is interesting to note that most of the firms showing substantial drops in profits were those affected by the 5-week mid-year cement strike. To the best of our knowledge, no companies reported actual losses.

The profit picture for 1958 is not bright. Some price increases have already been announced, but many producers are apparently hesitant about taking such steps while demand is lagging. As a result, costs are likely to go up faster than prices. Even if the expected increase in demand materializes later in the year, profits are likely to drop again in 1958.

According to a large company with plants throughout most of the country: "The cost-price relationship in our industry is out of balance because employment costs and the cost of purchased goods and services have increased without corresponding increases in cement prices. Our company is constantly striving to find the means of reducing those costs, over which we have some measure of control, through methods improvement and thus to lessen the upward pressure on prices as much as possible."

Another large producer operating plants throughout the West and Middle West says: ". . . Labor rates were increased substantially following the strike in the industry late in the summer of 1957; there is no indication that this trend will change during the coming year. Other costs are increasing also, particularly of fuel and power, although practically everything we have to buy to run our business is priced to us higher now than was the case even six months ago. Under circumstances such as these it is quite obvious that the most modern manufacturing methods and a full measure of mechanization will be necessary in order to survive the cost-price squeeze which appears to be shaping up."

A California producer reports: "Labor and other costs are up and prices will be up a bit. Actually the only important price increase noted so far in our marketing territory is a 15-cents-a-barrel increase announced for northern California, Oregon, and the Territory of Hawaii, effective January 1, 1958."

Another California producer says: "Symptoms of the buyer's market have been idle capacity during certain periods of the year, increased freight absorption, and price resistance. With manufacturing costs—especially labor and fuel—continuing to increase at a rapid rate, the result has been a serious cost-price squeeze. Our price increase of 15 cents per barrel, to be effective January 1, 1958, has already been swallowed up in higher costs incurred during 1957."

1957 Capacity Increase

The portland cement industry in 1957 undoubtedly set a new all-time record of increase in capacity and has far exceeded the previous post-war record of 34,000,000 bbl. added in 1956, which brought the capacity up to 349,442,000 bbl. at the end of the year, also a new record. It is estimated that more than 38,000,000 bbl. of capacity was completed in 1957 in the form of new plants and plant expansions. Some of this, of course, replaced existing obsolete equipment but most of it—we estimate about 25,000,000 bbl. — was new capacity. The productive capacity at the end of 1957 is, therefore, estimated to be about 375,000,000 bbl. At least 38 new kilns and 69 new grinding mills were installed. The cost of all these expansions and improvements was close to $190,000,000.

New Plants The eight new plants completed in 1957 have a combined capacity of about 13,000,000 bbl., and all but a small part of this is new capacity. Included in these plants were 13 new kilns and 27 new grinding mills. Four of these plants are completely new and in new locations. The other four are actually new plants built alongside older installations still operative, on which they depend only in minor ways such as sharing existing raw material sources, raw material and clinker storage, or cement storage facilities. No plants are known to have been abandoned during the year. The eight new plants completed in 1957 compare with four in 1956 (plus one for clinker grinding only), two in 1955, two in 1954, none in 1953, three in 1952, three in 1951, four in 1950, one in 1949, two in 1948, and one in 1947—a total of 31 in the 11 years since V-J day.

The eight new plants built in 1957 are those of Lehigh Portland Cement Co., Union Bridge, Md.; Lone Star Cement Corp., Lake Charles, La.; Marquette Cement Mfg. Co., Cape Girardeau, Mo., and Milwaukee, Wis.; Oregon Portland Cement Co., Lime, Oreg.; Permanente Cement Co., Cushenbury, Calif.; Texas Portland Cement Co., Orange, Tex.; Universal Atlas Cement Co., Buffington, Ind.

Plant Expansions At least 26 existing cement plants are known to have completed major expansion and/or improvement programs in 1957. Others made minor changes, some of which also added to capacity. Included in these programs were at least 25 new kilns and 42 new grinding mills. These 26 plants are known to have installed at least 24,000,000 bbl. of capacity during the year. Of this total probably 12,000,000 bbl. was new capacity not replacing existing capacity.

Capacity The total capacity estimated to have been installed in 1957 — 38,000,000 bbl.— compared with our estimate of 34,500,000 bbl. in 1956. We estimated a year ago that about 27,500,000 bbl. was actual new capacity, comparing

with our estimate of 25,000,000 bbl. of new capacity in 1957. The actual increase in capacity of the industry in 1956 reported recently by the U. S. Bureau of Mines was 34,143,000 bbl.

In 1956 apparently about 90.6 percent of the year-end capacity of the industry was used, compared with official figures of 94.3 percent in 1955 and 91.4 percent in 1954. With the estimated capacity of the industry about 375,000,000 bbl. at the end of 1957, and the production about 304,000,000 bbl., only about 81 percent of the year-end capacity was utilized in that year. Little change in this percentage is expected in 1958.

Official figures on the capacity of the portland cement industry in the United States are as follows:

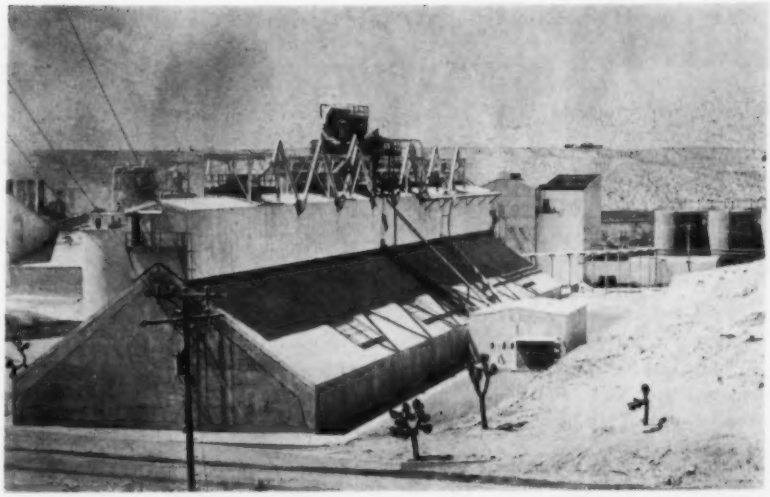
End of	
1948	254,272,378 bbl.
1949	258,948,399 bbl.
1950	259,448,000 bbl.
1951	281,873,000 bbl.
1952	284,014,416 bbl.
1953	287,498,330 bbl.
1954	294,298,000 bbl.
1955	317,369,000 bbl.
1956	349,442,000 bbl.
1957 (est.)	375,000,000 bbl.

Future Increases

The information available at this time on the amount of plant expansion for 1958 and later is so incomplete that only rough estimates are possible. Projects which have not yet been announced could be started and completed within the year and others under way could still be expanded. Under existing conditions, it is likely that some projects not yet started could be postponed and that others already under way could be curtailed or even stopped.

The 19 plants whose 1958 major expansion plans are known—most of them well under way—and the 9 new plants scheduled for 1958 completion, together will install at least 27 new kilns and 64 new grinding mills, as well as the other necessary equipment, at a cost of about $175,000,000. These projects involve a total of at least 27,000,000 bbl. of annual productive capacity, of which it seems that as much as 18,000,000 bbl. might be new capacity.

Allowing for the possibility that some of this work might be postponed because of the present overcapacity of the industry and the probability that some might not be completed until 1959, it still seems that at least 10,000,000 bbl. is sure to be added to the industry capacity, for a new peak of perhaps 385,000,000 bbl. at the end of 1958. As long as capacity stays far ahead of demand, some of the old capacity will be taken out of production temporarily in favor of newer and more efficient equipment; but the favorable long-term prospects for the industry indicate that little of this older equipment will actually be dismantled.



New storage, packing, and bulk-loading facilities were installed by the Riverside Portland Cement Co. at its Oro Grande, Calif., plant. Clinker grinding capacity was also increased in 1957.

New Plants There are actually five new cement plants in various stages of construction which should be in operation by the middle of 1958, and a sixth should be completed later in the year. Ground is known to have been broken for three other new plants slated for completion either late in 1958 or early in 1959. Plans have also been formally announced by existing cement producing companies for three other plants to be started in 1958 and completed in 1959.

The nine plants scheduled for completion in 1958 will have a total of 14 kilns and 32 grinding mills, and a combined capacity of about 15,000,000 bbl. annually. Six of them will be completely new operations at new locations. The others will be basically new plants alongside existing operations and depending on them only for minor functions. The cost of these nine new plants will be about $116,000,000.

The six new plants now in various stages of construction, scheduled for completion early in 1958, are: Alpha Portland Cement Co., Lime Kiln, Md.; Ideal Cement Co., Houston, Tex.; General Portland Cement Co., Miami, Fla.; Lehigh Portland Cement Co., Miami, Fla.; Medusa Portland Cement Co., Wampum, Pa. The Ada, Okla., plant of Ideal is scheduled for completion later in 1958. The three plants for which ground has reportedly been broken are: Arkansas Cement Corp., Foreman, Ark.; Mississippi Valley Portland Cement Co., Redwood, Miss.; Permanente Cement Co., Scholle, N. M.

The three plants for which plans have been announced and which, if built, would probably not be completed until 1959, are: Ideal Cement Co., Tijeras, N. M., and Redwood City, Calif.; Lehigh Portland Cement Co., Mitchell, Ind.

Plans were announced recently for a proposed $10,000,000 cement plant to be built at Dundee, Mich., about 40 miles southwest of Detroit. This operation is to be known as the Dundee Cement Co., and it is reported that 1,400 acres of land has been acquired.

The Columbia-Southern Chemical Corp., Pittsburgh, Pa., recently announced plans to build a $7,000,000 cement plant near its limestone mine at Barberton, Ohio. Capacity will be 1,000 bbl. per day initially. Grading has already started.

The Arizona Portland Cement Co. recently announced that it will build a new 2,000,000 bbl., $12,000,000 plant at Ash Fork, Ariz. This dry-process, 2-kiln plant is expected to be in operation early in 1959.

It is reported that plans may be announced soon for a proposed plant at Clarksdale, Ariz. There has been no recent information on the proposed plant of the New Mexico Portland Cement Co. at Las Vegas, N. M.

Plant Expansion It is difficult to make any solid prediction of the amount of plant expansion to take place in 1958. This is partly because of the uncertain

phase through which our economy is now going and partly because such expansions are often given little advance publicity and therefore much of the work to be done in 1958 is not yet known to us.

At this time it is known that at least 16 plants have major expansion programs under way or definitely scheduled for completion in 1958. These projects involve about 13 new kilns and 32 grinding mills, with a total capacity of about 12,000,000 bbl. and they will cost about $60,000,000. Even more than in 1956, it is now difficult to tell how much of the capacity added by plant expansions in 1958 will be actual new capacity and how much will replace obsolete equipment.

Trends In Manufacture

There has never been a time when there was more activity in the development of the science of cement manufacture. And this advance has been taking place during a period when the attention of the industry has been directed more than ever before to increasing its productive capacity. One of the major aims has been greater fuel economy, but greater mechanical efficiency, more uniform and accurate blending of raw materials, and better and more uniform control of product quality are also getting concentrated attention.

The last few years have seen a revival of efforts in this country to get away from the high first cost and low fuel efficiency of the rotary kiln. A number of alternative or supplementary burning systems have been developed, some of which have already been installed in cement plants here and abroad. Among these are: The Fuller-Humboldt suspension-type preheater, which preheats the pulverized raw material in four successive stages of cyclones before it goes to a short rotary kiln section for calcining; the Allis-Chalmers A.C.L. system (an improvement on the Lepol kiln), which preheats pelletized raw material in a double-pass grate unit before it goes to a short rotary kiln calcining section; the F. L. Smidth slurry preheater, which operates in connection with a chain system and a quadrant system in a full-length rotary kiln; the Kennedy-Van Saun Grudex preheater, which passes the pulverized raw material through spiral tubes in a heating chamber before it goes to a rotary kiln calcining section.

Efforts have been made to interest producers in this country in vertical cement kilns of the type commonly used in Europe and elsewhere. These are mixed-feed kilns and it is the ash remaining in the finished cement which has so far made the product unacceptable in this country. It is reported that some success has already been achieved with oil and gas firing of these kilns which would presumably overcome this objection.

Other systems are under development in this country which are in the laboratory model or pilot plant stage but only one of these, apparently, has reached the stage where its developers are willing to publicize it in detail. This is the counter-cyclone clinkerer designed and patented by Dr. J. C. Witt, which has been described in some detail in PIT AND QUARRY. A feature of this system is that calcining is accomplished in a few minutes. Another is the Pyzel system being developed by the Fuller Co. Still another is the "jet-engine" type of kiln patented by M. A. Booth.

The intensified efforts to find better methods of calcining tie in very closely with an apparent trend toward the dry process. The wet process had long been favored because it made possible more accurate raw material blending. However, it is now possible to blend dry raw materials accurately and efficiently with the various homogenizing and blending systems now available. One of these, the Fuller quadrant homogenizing system, has achieved considerable popularity in the short time it has been available.

The combination of drying and grinding raw materials in air separators in circuit with grinding mills is getting to be almost standard in dry-process plants. The combination of these two functions in a grinding circuit is not new but feeding the raw materials first to the separators before going to the mills is new. There is a trend in the industry toward coarser raw material feed, depending on the nature of the material, but feeding material over 1½ in. in size to the separator is not recommended. Those using the circuit point to lower power, installation and operating costs due to the elimination of dryers, bins, and conveying equipment, and lower dust loss. Such an installation is also much more compact.

In wet process operations closed circuit raw grinding continues to be popular but screens and cyclone separators are being installed in most cases instead of other types of equipment. In raw grinding in general there is a trend toward a coarser product, in some cases to percentages in the 60's through 200 mesh. The power savings are said to outweigh any other factors involved.

There is a continued trend toward automation, especially in connection with kiln operation. As many as 44 separate controls are used with some of the large new rotary kilns, and up to 56 controls with a grate-rotary kiln. Many of these controls are automatically interlocked so the kiln operator need usually be concerned with only a few of them. One company is reported to be working on the application of an electronic brain computer to automatically control and regulate kiln operation. It is estimated that a machine capable of doing this job would cost several hundred thousand dollars.

The practice of using slurry thinners or dispersing agents for reduction of water content with no change in viscosity is growing. Users claim more grinding capacity, more slurry storage capacity, greater kiln output and lower fuel consumption. Some plants with closed circuit wet grinding are reported to be using flocculating agents to improve flotation and sedimentation in thickeners.

A recent development which may prove usable in wet process plants is a radiation density meter for slurry control. This unit may make it possible to use X-ray diffraction analysis to automatically regulate the composition of slurry.

The practice of returning collector and stack dust into the kiln is increasing and molasses is being used in some cases to prevent the formation of mud rings in the feed end. Several plants in this country are returning this dust to the raw mills for dehydration, etc. Another practice being used in Canada and in some U. S. plants is the return of this dust near the center of the kiln by means of scoops, bypassing chain systems. A practice starting to catch on here which has long been popular in Europe is insufflation, feeding the dust in with the fuel.

There is a steady increase in the use of aerated conveyors in place of screw conveyors and even pneumatic pumping systems.

There has long been agitation for the elimination of the barrel (376 lb.) terminology to indicate cement quantity, in favor of the hundredweight and the short ton. This would be similar to the European practice of long standing. The fact that Canadian statistics, effective March 1957, are now in tons instead of the former 350 lb. Canadian barrels, may hasten its acceptance in this country. The advantages of any such system, whether metric or not, over our medieval system of weights, measures and volumes, is obvious.

This progress photo shows construction under way on the new 2,150,000-bbl. plant being built by Ideal Cement Co. at Ada, Okla., alongside its older plant there. Completion is scheduled for July, 1958. Equipment includes a 12- by 450-ft. kiln.

Changes in Ownership

Again in 1957 there were several changes in ownership among cement plants and companies in the United States. One of these was the absorption of a single plant by a large corporation not in the cement business; another added two plants in remote areas to a two-plant company. In two other deals large companies expanded into new areas by taking over one and two-plant companies, respectively.

The Lone Star Cement Corp. on April 1, 1957 took over Superior Portland Cement, Inc., with plants at Concrete and Seattle, Wash., and a quarry on Dall Island, Alaska. These plants have a combined capacity of 2,700,000 bbl. annually.

Later in the year the Flintkote Co. announced that it had acquired the Kosmos Portland Cement Co., with a 2,000,000-bbl. plant at Kosmosdale, Ky., for an indicated price of about $15,000,000. Some of the cement produced will be used by Flintkote plants at New Orleans and Chicago Heights, and one now being built in Indiana.

The Ideal Cement Co. announced that it had acquired the plant and assets of the Northwestern Portland Cement Co., Seattle, Wash. The plant at Grotto, Wash., has a capacity of 600,000 bbl. annually.

The latest combine, just completed, was a merger of the Riverside Cement Co. and the Hercules Cement Corp. with the Peerless Cement Corp., Detroit, Mich. The final decision on this plan was approved in December. The combined company is to be called the American Cement Corp. and each of the three corporations is to be operated as an autonomous division. The total annual capacity will be about 18,500,000 bbl. Hercules operated a plant at Nazareth, Pa., Peerless had two plants in Detroit and one at Port Huron, Mich., and Riverside had plants at Crestmore and Oro Grande, Calif.

A change within a company structure was recently announced by the Pittsburgh Plate Glass Co. The Columbia Cement Div., which operates a 3,000,000-bbl. plant at East Fultonham, Ohio, has transferred this operation to the Columbia - Southern Chemical Corp., a wholly - owned subsidiary.

Imports and Exports

There is at this time no detailed information available on imports of cement into the United States in 1956 and 1957. However, it is known that 1956 imports were substantially under 1955 and that there was probably a further slight decrease in 1957. Imports in 1955 totaled 5,219,700 bbl., valued at $14,354,412. This dropped to 4,456,120 bbl. in 1956, with little change in value at $14,188,575. In the first nine months of 1957, January through September, imports were 3,290,711 bbl. with a total value of $12,281,175. It is interesting to note that the value of imports rose from $2.74 per bbl. in 1955 to $3.17 in 1956, and $3.76 in the first nine months of 1957.

There was no information on the source of imports in 1956 or 1957 but there was probably little change from 1955 when the leading exporters, in the order of their importance, were: Belgium-Luxemburg, West Germany, Canada, Sweden, and Mexico. It is believed that Israel, which ranked ninth in exports in 1955, probably moved up into the first five in 1956.

There was apparently a substantial drop in the exports of portland cement from the United States in 1957. Exports for the first 10 months totaled 1,098,110 bbl., valued at $4,493,756. This compares with 1,973,221 bbl., valued at $7,249,818 in all of 1956 and 1,795,448 bbl., valued at $7,066,918 in 1955. It is interesting to note that values per bbl. exported dropped from $3.95 per bbl. in 1955 to $3.68 in 1956 and rose again to $4.11 per bbl. in 1957.

Plant Expansions

Allentown The Allentown Portland Cement Co. completed new cement storage silos at its Evansville, Pa., plant in 1957. It is reported to have near completion a new stone-grinding and drying department which includes two 11- by 17-ft. 8-in. Traylor raw mills.

Alpha The Alpha Portland Cement Company has just completed an improvement program at its St. Louis, Mo., plant which increased its capacity by 500,000 bbl. at a cost of about $7,000,000. New equipment includes three Nordberg finish mills, slurry storage tanks, an 11- by 380-ft. Nordberg kiln, a 6- by 33-ft. Fuller horizontal air-quenching clinker cooler, 140,000-bbl. bulk-loading si-

los, etc. This work was done by the Macdonald Engineering Company.

Improvements being made at the Ironton, Ohio, plant include the installation of three 11- by 17-ft. dry-grinding ball mills.

Scheduled for completion by July 1, 1958, is the company's new 2,000,000-bbl. $18,000,000 plant at Lime Kiln, Md. Equipment includes two 11-ft. 3-in. by 400-ft. kilns, two 9- by 33-ft. raw mills, and two 9- by 35-ft. finish mills—all Allis-Chalmers—a Traylor primary crusher, a crushing department, a new raw- and finished-material storage, bulk silos, and two 6- by 37-ft. Fuller horizontal air-quenching clinker coolers. The Macdonald Engineering Co. is doing the design and construction of the entire plant. With the completion of this project the combined capacity of the company's nine plants will be about 15,000,000 bbl. annually.

Arizona The Arizona Portland Cement Company, a subsidiary of the California Portland Cement Company, recently announced that it has broken ground for a new 2,000,000 bbl., $12,000,000 plant at Ash Fork, Ariz. This dry-process, 2-kiln plant is expected to be in operation early in 1959.

Arkansas The Arkansas Cement Corporation, a wholly-owned subsidiary of the Arkansas Louisiana Gas Company, is reported to be going ahead with the construction of a new plant at Foreman, Ark. Equipment ordered for this plant includes a 12- by 450-ft. Smidth kiln, two 1,500-hp. Unidan mills—one raw and one finish, and a natural gas-engine-driven electric power generating plant. This plant is expected to have a capacity of 1,400,000 bbl. annually, and to cost over $12,000,000. Ground was broken for this plant on November 30, 1957, and completion is expected late in 1958. The plant was designed by Kaiser Engineers.

Ash Grove The Ash Grove Portland Cement Co. in 1957 completed a modernization and expansion program at its Louisville, Nebr., plant similar to the one completed in 1956 at its Chanute, Kans., plant. New equipment at Louisville included a 10- by 325-ft. F. L. Smidth kiln and two 800-hp. Unidan mills—one raw and one finish.

California The California Portland Cement Co. is reported to have just completed an expansion program at its Mojave, Calif., plant which went into operation late in 1955. This increased its capacity 3,500,000 bbl. annually to 5,500,000 bbl. The two original 11- by 12- by 350-ft. Allis-Chalmers kilns have been supplemented by three more kilns of the same size and make. Five 10-ft. 6-in. by 17-ft. Allis-Chalmers grinding mills were added.

Carolina Giant The Carolina Giant Portland Cement Co. in 1957 completed an expansion program at its Harleyville, S. C., plant which increased its capacity 1,000,000 bbl., or over 60 percent. New equipment includes an 11-ft. 3-in. by 425-ft. kiln, a 1,000-hp. Unidan raw mill and an 8- by 80-ft. marl dryer—all F. L. Smidth—an Allis-Chalmers 11-ft. 6-in. by 17-ft. finish mill, a 250-ft. raw material crane storage, and 100,000-bbl. bulk loading cement silos. This work was done by the Macdonald Engineering Co. It is reported that facilities were also installed for the production and packing of masonry cement.

Consolidated The Consolidated Cement Corp., which late in 1956 completed a new 1-kiln, 1,250,000-bbl. plant at Paulding, Ohio, is reported to have completed the addition of a second 11-ft. 3-in. by 425-ft. F. L. Smidth kiln and two 9-ft. 3-in. by 36-ft. Nordberg mills.

Diamond Portland The Diamond Portland Cement Co., Middlebranch, Ohio, in October 1957 completed a $4,000,000 expansion program which increased its capacity by 1,000,000 bbl. to 2,400,000 bbl. annually. Included is a 12-ft. 6-in. by 75-ft. Allis-Chalmers A. C. L. grate kiln with a 12-ft. 6-in. by 160-ft. rotary section, followed by a 6- by 100-ft. air-quenching cooler, and a quadrant raw-material blending system. Also installed were two 1,000-hp. 10-ft. 6-in. by 17-ft. Allis-Chalmers raw mills. The existing raw mills will be converted to finish mills to grind the increased clinker capacity. W. R. Bendy, cement engineers, developed the overall program and structural design, and plant layout and supervision of construction were handled by Macdonald Engineering Co. in co-operation with Bendy engineers.

General The General Portland Cement Co. is reported to be progressing rapidly with the construction of its $10,000,000 wet-process plant near Miami, Fla., which is scheduled for completion early in 1958. Equipment includes two 11-ft. 3-in. by 425-ft. F. L. Smidth kilns, and the plant will have a capacity of 1,250,000 bbl. annually. Work under way on doubling the capacity of this plant, at an added cost of $5,000,000, is slated for completion in 1958.

Hercules The Hercules Cement Corp., early in 1957 completed the installation of a new kiln at its Stockertown, Pa., plant which increased its capacity by 500,000 bbl. to 3,300,000 bbl. annually. This 12- by 280-ft. F. L. Smidth kiln replaced four old kilns and is identical with two others previously installed. The modernization program, begun in 1952, includes new milling and material-handling facilities and is expected to be substantially completed in 1958.

Hercules recently became a part of a new firm, the American Cement Corporation, upon the completion of a merger also including the Riverside Cement Company and the Peerless Cement Corporation.

Hudson The Colonial Sand and Stone Co., Inc., of New York City, recently announced that the firm is building a $1,500,000 cement plant at Kingston, N. Y. When completed within the year, the plant will have an initial capacity of 2,500 bbl. daily. Much of the cement produced will be used in Colonial's ready-mixed concrete operations. The plant will be operated by the Hudson Cement Corp., a wholly-owned Colonial subsidiary. Equipment already ordered includes a Traylor wash mill and an apron feeder.

Huron The Huron Portland Cement Co. early in 1957 completed a 3,000,000-bbl. addition to its plant at Alpena, Mich., which gave it a total clinker producing capacity of about 12,000,000 bbl. annually. Major items of equipment include two Fuller-Humboldt suspension-type preheaters with 11- by 175-ft. Allis-Chalmers rotary kiln sections, five Allis-Chalmers mills—two raw and three finish—air separators, two Traylor gyratory crushers, etc. The McDowell Co. erected most of the new buildings and equipment.

About midyear Huron bought the Wyandotte Chemical Corporation's quarry at Alpena, which had supplied Huron with stone for 50 years.

At the Cleveland, Ohio, distribut-

ing plant five new storage silos were added, doubling the storage capacity. The silos are 34 ft. in diameter and 119 ft. high. Work is also under way on a new storage and distributing plant on the St. Joseph River in Michigan.

Ideal The Ideal Cement Co. made considerable progress during 1957 on an expansion program which will increase the capacity of its plants to 31,000,000 bbl. in 1958. Further plans have been announced to boost capacity to 40,000,000 bbl. in the next 10 years, at a cost of $170,000,000. At the end of 1957 the company had near completion a new plant at Houston, Tex., and a virtually new plant alongside the existing operation at Ada, Okla. Major expansions were completed at the Boettcher, Colo., and Okay, Ark., plants. Construction is going ahead on a completely new plant at Tijeras, N. M., and an addition, essentially a new plant, will be made at Redwood City, Calif. Ideal in 1957 also took over the Northwestern Portland Cement Co. with a 600,000-bbl. plant at Grotto, Wash.

The new 2,800,000-bbl., $16,000,000 plant at Houston, Tex., is scheduled for completion about April 1, 1958. This is being built alongside the existing 1,250,000-bbl. plant there. Major equipment includes two 12- by 450-ft. kilns and four 11- by 32-ft. mills—all Allis-Chalmers.

A new $1,500,000 terminal at Lake Charles, La., is scheduled for completion in April, 1958. At the Baton Rouge, La., and Mobile, Ala., plants electrical precipitators are being installed at a cost of $1,100,000 for completion late in 1958.

Near completion at Ada, Okla., is a $16,000,000 addition to the existing 2,150,000-bbl. operation which is in itself virtually a new plant. This will have a capacity of 1,500,000 bbl. annually and is scheduled to go into operation about July 1, 1958. Major equipment includes a 12- by 450-ft. Allis-Chalmers kiln, two 11- by 32-ft. grinding mills, etc.

In March, 1957, a $12,000,000 expansion and improvement program was completed at the Boettcher, Colo., plant which increased its capacity by 800,000 bbl. The old dry-process plant was converted to the Fuller-Humboldt preheater process, with two such units. Also installed were two Allis-Chalmers raw mills, dust collectors, additional cement storage, and a Fuller quadrant raw material blending system.

In August, 1957, work was completed at Okay, Ark., which increased the capacity of this plant 300,000 bbl. annually. The No. 2 kiln was lengthened, and a new cooler was installed. A 1,000-hp. Unidan raw mill will be installed in 1958.

In 1957 Ideal installed a temporary terminal in Broderick, Calif., on the Sacramento River. This will be used until a $1,900,000 permanent terminal and packing plant is completed early in 1958 to distribute cement brought in by barge from the Redwood City plant.

Ideal is going ahead with the construction of its new 1,000,000-bbl., $12,000,000 plant at Tijeras, N. M. A contract was recently awarded for grading roads and other preparatory work. Equipment will include an 11- by 12- by 375-ft. kiln and two 11-ft. 6-in. by 17-ft. mills—all Allis-Chalmers. Completion is scheduled for about August, 1959.

Also scheduled for 1958 or later is the construction of a 3,000,000-bbl. addition to the Redwood City, Calif., plant which will be essentially a new plant. Equipment will include two 12- by 450-ft. kilns and four 2,000-hp. Smidth Unidan mills —two raw and two finish.

Lehigh The Lehigh Portland Cement Co. early in 1957 announced a new 2-year expansion program to cost $43,000,000, of which about $32,300,000 was to be spent in 1957. Included were new plants in Miami, Fla., and Union Bridge, Md.; and increased capacity at Mason City, Iowa, Buffalo, N. Y., and Metaline Falls, Wash. Later it was announced that a new plant would be built at Mitchell, Ind., to replace the old plant there.

The most important 1957 project, at Union Bridge, Md., was completed late in the year. A 2,000,000-bbl., $21,000,000 new plant was built alongside the existing 1,000,000-bbl. plant at that location. Equipment includes three 11-ft. 6-in. by 400-ft. kilns, three 9-ft. 6-in. by 26-ft. 3-in. Unidan clinker grinding mills with Symetro drives, and three Tirax coal mills—all F. L. Smidth—and a Traylor gyratory crusher.

The new Miami, Fla., plant will go into operation early in 1958. This 2,000,000-bbl., $21,000,000 wet-process operation has two 12- by 11- by 475-ft. kilns and eight Unidan mills —three 1,250-hp. mills for raw grinding, three 1,250-hp. mills for clinker grinding, and two 900-hp. mills for sand (all F. L. Smidth)— a Traylor jaw crusher, and a Fuller horizontal clinker cooler. This work was done by the Macdonald Engineering Co.

The expansion program at the Mason City, Iowa, plant will be completed early in 1958. It will increase the capacity of this plant by 1,000,000 bbl. to 3,000,000 bbl. annually. Equipment being installed includes an 11-ft. 6-in. by 400-ft. rotary kiln, two 1,250-hp. Unidan clinker mills, and a 1,250-hp. Tirax raw mill—all F. L. Smidth—and electrical precipitators.

The proposed new plant at Mitchell, Ind., will have two large kilns which will about equal the capacity of the ten old kilns now in use there. Construction will be done in stages over a period of years, so as not to interfere with production. The kilns

The Monarch Cement Company's plant at Humboldt, Kans., has near completion an expansion program which will double its capacity to 2,250,000-bbl. annually. This work affected nearly every department of the plant.

will be installed first and they are expected to be in operation late in 1959.

Lone Star The Lone Star Cement Corp. in 1957 continued on an undiminished scale the extensive expansion program which when completed will have increased the total capacity of its domestic operations to 38,800,000 bbl. annually. The new 2,000,000-bbl. plant at Lake Charles, La., went into operation in mid-1957. The 800,000-bbl. expansion at Lone Star, Va., was completed early in 1957, as were the 1,400,000-bbl. expansion at Dallas, Tex., and the 1,100,000-bbl. expansion to the Houston, Tex., plant. Near completion is the 1,000,000-bbl. expansion at Hudson, N. Y., and the similar program at Nazareth, Pa. As stated earlier in this article, Lone Star early in 1957 took over Superior Portland Cement, Inc., with plants at Concrete and Seattle, Wash., having a combined capacity of 2,200,000 bbl. annually.

The new $14,000,000 Lake Charles La., 2,000,000-bbl. wet-process plant went into operation in July, 1957. Equipment includes two 11-ft. 3-in. by 400-ft. Allis-Chalmers kilns, three 9- by 32-ft. raw and three 9- by 30-ft. finish mills—also Allis-Chalmers—and 7- by 44-ft. Fuller inclined grate coolers. Koppers electrostatic precipitators clean the kiln gases. The storage silos and packhouse were designed and built by the Macdonald Engineering Co.

The 800,000-bbl. expansion program completed early in 1957 at the Lone Star, Va., plant included a Fuller quadrant raw material blending system, a fourth 10- by 340-ft. rotary kiln, a fourth Koppers electrical precipitator, an 11- by 16-ft. raw mill, two 8- by 32-ft. finish mills, a new crushing department, etc.

Also in operation early in 1957 was new equipment at the Dallas, Tex., plant, which increased its capacity by 1,400,000 bbl. to 3,700,000 bbl. annually. Added were: a 9- by 32-ft. raw mill, two 11- by 275-ft. Smidth rotary kilns with grate coolers, two Allis-Chalmers 9- by 30-ft. finish mills, Western Precipitation electrical precipitators for all six kilns, slurry tanks, clinker silos, and a new 300-ft. stack.

At Houston, Tex., capacity was increased by 1,100,000 bbl. to 3,200,000 bbl. annually. New equipment included a 9-ft. 6-in. by 15-ft. ball mill, an 8-ft. 6-in. by 36-ft. 2-compartment wet tube mill—both Nordberg—an 11-ft. 3-in. by 400-ft. F. L. Smidth kiln, a 10-ft. 6-in. by 156-ft. Smidth rotary cooler, a 9-ft. 6-in. by 34-ft. Nordberg 2-compartment finish mill, a Buell electrostatic precipitator for all three kilns, a clay wash mill, slurry tanks, and a 300-ft. stack.

The two-stage modernization and expansion of the dry-process Nazareth, Pa., plant is expected to be completed early in 1958. In operation in 1956 were: a new crushing department; new raw- and finish-grinding departments in one building with eight 11- by 16-ft. ball mills—three for raw- and five for finish-grinding—equipped for drying in the separators; completed in 1957 was a Fuller quadrant raw material blending system; and near completion are two 11-ft. 3-in. by 300-ft. Traylor kilns with 7- by 44-ft. Fuller grate coolers and coal mills; Research Cottrell combination mechanical and electrostatic dust precipitators; and two 225-ft. concrete stacks.

The nearly completed expansion of the Hudson, N. Y., plant will increase its capacity 1,000,000 bbl. to 3,000,000 bbl. annually. Included were the following: a new crushing department, extension to the rock storage building, two 9-ft. 6-in. by 15-ft. ball mills in closed circuit with vibrating screens, two 7- by 22-ft. wet grinding tube mills, an 11- by 300-ft. rotary kiln, complete with slurry filters—all Allis-Chalmers; also a cooler, a coal mill, a Western Precipitation combination mechanical and electrostatic dust collector, a 175-ft. concrete stack, slurry tanks, and a new finish-grinding department with four 9½- by 14-ft. ball mills and four 7- by 26-ft. tube mills—also Allis-Chalmers.

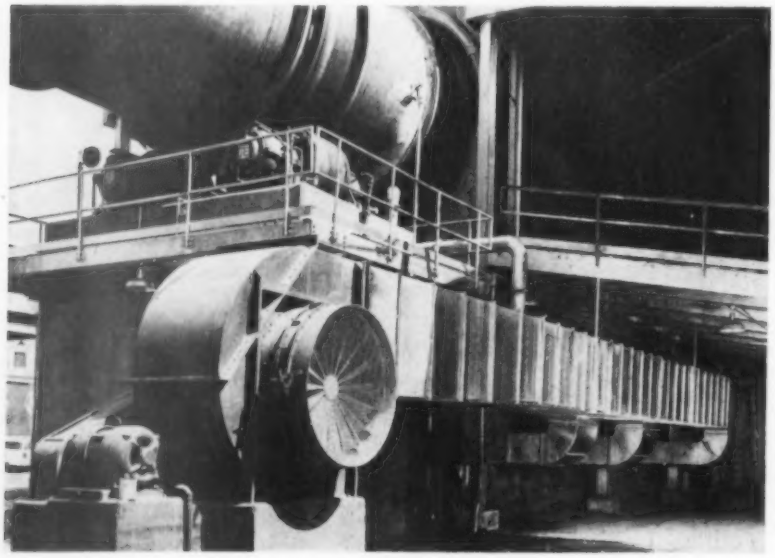
Longhorn The Longhorn Portland Cement Co., San Antonio, Tex., in 1957 added three bulk truck loading silos with a total capacity of 60,000 bbl. These were designed and built by the Macdonald Engineering Co.

Louisville The Louisville Cement Co. has near completion the installation of a new 11- by 390-ft. Allis-Chalmers kiln, a Fuller quadrant raw material blending system and a 7- by 33-ft. Fuller horizontal air-quenching clinker cooler. Two 13- by 16-ft. Allis-Chalmers raw mills were installed in 1957. This improvement program will be completed in 1959.

Marquette The Marquette Cement Mfg. Co. early in 1957 announced that expenditures of nearly $10,000,000 would be made in 1957 for the improvement of its plants at Nashville, Tenn., Rockmart, Ga., and Superior, Ohio. This was in addition to the new plant at Milwaukee, Wis., completed early in 1957, and the plant added to the Cape Girardeau, Mo., operations later in the year.

A major addition of the Marquette Cement Mfg. Co. to the capacity of the industry in 1957 was the new plant built alongside its existing operation at Cape Girardeau, Mo. This 1,250,000-bbl., $7,000,000 wet-process plant went into operation in February 1957. Major equip-

A new horizontal grate-type clinker cooler which is one of the new developments of 1957. A number of these were installed during the year.



ment includes a 12- by 450-ft. kiln, a 6- by 100-ft. horizontal shaking grate cooler, two 8- by 37-ft. 2-compartment raw mills, and two 10-ft. 6-in. by 17-ft. finish mills—all Allis-Chalmers. Kaiser Engineers had the contract for the design and construction of this plant. The Macdonald Engineering Co. built the 100,000-bbl. plant storage silos, 30,000-bbl. barge-loading silos, and slurry tanks.

The new $7,000,000 plant at Milwaukee, Wis., has the first installation in this country of the Allis-Chalmers A.C.L. kiln—a combination of grate and rotary. This plant has a 6- by 100-ft. Allis-Chalmers air-quenching clinker cooler and four 10-ft. 6-in. by 17-ft. Allis-Chalmers grinding mills. This plant has a capacity of 1,250,000 bbl. annually. Late in 1957 a new 14-silo cement storage was completed, with a capacity of 210,000 bbl. This was built by the Macdonald Engineering Co.

The expansion of the Nashville plant, at a cost of $2,500,000, includes a new 11-ft. 6-in. by 400-ft. Allis-Chalmers kiln to replace two smaller units. Other equipment includes a coal mill, a clinker cooler, and an electrical precipitator. At Superior, Ohio, cement storage silos of 210,000-bbl. capacity were built by the Macdonald Engineering Co.

Medusa The Medusa Portland Cement Co. early in 1957 completed an $8,000,000 rebuilding project at its Dixon, Ill., plant which increased its capacity by about 1,000,000 bbl. annually. Included were three Fuller-Humboldt preheaters with 10-ft. 6-in. by 150-ft. Allis-Chalmers rotary kiln sections and Fuller quadrant raw material blending systems. This program increased the total capacity of the company's seven plants to 10,250,-000 bbl. annually.

Near completion is a new 1,600,-000-bbl., $12,000,000 plant at Wampum, Pa., which will replace the plant now operating there. Equipment includes two 12- by 390-ft. kilns, two 11-ft. 6-in. by 17-ft. raw mills, and two 13- by 16-ft. finish mills—all Allis-Chalmers.

Mississippi Valley Early in 1957 ground was broken for the new 680,000-bbl., $3,-800,000 plant of the Mississippi Valley Portland Cement Co. at Redwood, Miss. The necessary equipment has been ordered from Kennedy-Van Saun. Production is scheduled for the fall of 1958.

Missouri The Missouri Portland Cement Co. early in 1957 was reported to have completed an expansion program at its Sugar Creek, Mo., plant (near Independence), which doubled its capacity to 2,400,000 bbl. Included was a second 360-ft. kiln, grinding mill, etc.

Under construction at Sugar Creek is an unloading station for gypsum and iron ore, and bulk cement track scales. At the St. Louis plant a 300,-000-bbl. bulk cement rail loading station is being built. This work is being done by the Macdonald Engineering Co.

Monarch The $6,500,000 expansion program begun early in 1956 by the Monarch Cement Co., Humboldt, Kans., is scheduled for completion early in 1958. This will increase the capacity of the plant 50 percent to 2,250,000 bbl. annually. Included is a new 450-t.p.h. crushing plant in the quarry, a third 10- by 230-ft. Allis-Chalmers kiln, and a completely new and modern milling department. This inincludes two 10-ft. by 15-ft. 6-in. raw mills, equipped for drying in the separators, and two 10- by 28-ft. finish mills. The Macdonald Engineering Co. made the general plant layout and is the general contractor.

North American The North American Cement Corp. in 1957 continued its improvement program at Security, Md., with the installation of a 9- by 30-ft. 2-compartment Traylor clinker mill.

Northwestern States The Northwestern States Portland Cement Co., Mason City, Iowa, which late in 1956 completed a two-year, 750,000-bbl. expansion program, in 1957 added 200,000-bbl. cement storage and packing facilities. This work was designed and built by the Macdonald Engineering Co.

Olympic The Olympic Portland Cement Co. is reported to have just completed a $1,500,000 expansion program at its Bellingham, Wash., plant which will double its capacity to 2,000,000 bbl. annually. Included is an 11- by 416-ft. F. L. Smidth Unax kiln, a 225-ft. Rust Engineering Co. reinforced concrete stack, and new crushing facilities.

Oregon The Oregon Portland Cement Co. in mid-1957 completed the $6,000,000 expansion program which affected both its Lime and Oswego, Oreg., plants. Recently installed at Lime were a new 9-ft. 6-in. by 10-ft. 9-in. by 350-ft. F. L. Smidth kiln, 1,000-hp. raw and finish Unidan mills, a clinker cooler, stack, slurry basins, etc. These additions constitute essentially a new plant which doubles the capacity at that location to 1,000,000 bbl. annually. Quarry facilities were also enlarged and improved.

This work practically duplicated that completed in April, 1956, at the Oswego plant, which increased its capacity by 800,000 bbl. to over 2,-000,000 bbl. annually, also at a cost of $3,000,000.

Permanente The Permanente Cement Co. in April, 1957, put into operation its new 2,-500,000-bbl., $12,000,000 plant at Cushenbury, Calif., in the Lucerne Valley. Major equipment includes two 12- by 450-ft. F. L. Smidth kilns, three 1,500-hp. Unidan mills—one raw and two finish—8- by 44-ft. Fuller inclined-grate clinker coolers, Research Cottrell electrical precipitator, etc.

At the Permanente, Calif., plant a new 400-t.p.h. crushed rock plant was built to supply material for road construction. A 1,250-hp. Smidth Unidan raw mill will be installed in 1958.

Permanente late in 1957 began operating a new deep-water shipping facility at Long Beach, Calif. This will serve industry in that area, receive cement when needed from the plant at Permanente, and ship to Hawaii and other Pacific points from the new Cushenbury plant. This plant can load or unload boats at the rate of 2,000 t.p.h.

A bulk distributing plant was also built at Corona, Calif.

Early in 1957 Permanente announced that it had purchased 2,200 acres of land, containing large limestone deposits, near Scholle, N. M., as the prospective site for a new cement plant. Engineering was completed and equipment ordered, including a 12- by 450-ft. kiln. This wet-process plant is expected to have a capacity of 1,400,000 bbl. annually and to cost $10,000,000.

Pittsburgh Plate Following the completion of a 1,300,000-bbl. expansion in 1956, the Pittsburgh Plate Glass Co. (Columbia Cement Div.), is completing a second expansion, to be in operation in 1958. Included is an 11-ft. 6-in. by 17-ft. finish mill, an extension to the materials storage, the conversion of two existing finish mills to raw mills, etc. This work will have little effect on the present

The Ponce Cement Corp. added bulk truck-loading silos of 178,000-bbl. capacity to its distributing plant at Port Everglades, Fla. Cement is received by boat from Puerto Rico.

3,000,000-bbl. annual capacity of this plant. Like the earlier work, it is being done by the Macdonald Engineering Co.

This 3,000,000-bbl. plant was formerly operated by the Columbia Cement Division of the Pittsburgh Plate Glass Company, but it was recently transferred to the Columbia-Southern Chemical Corporation, a wholly-owned subsidiary.

Columbia-Southern in December, 1957, announced plans to build a new 1,000-bbl. per day, $7,000,000 plant near its limestone mine at Barberton, Ohio, for completion early in 1959. Grading has already started.

Ponce The Ponce Cement Corp. in 1957 added 12 silos with a capacity of 176,000 bbl. to its distributing plant at Port Everglades, Fla. These direct bulk-truck-loading silos were designed and built by the Macdonald Engineering Co. This plant distributes cement received by boat from Puerto Rico.

Riverside The Riverside Portland Cement Co. in September 1957 completed a $4,400,000 expansion program which increased the cement-grinding capacity at its Oro Grande, Calif., plant by 50 percent. Two new 12- by 17-ft. grinding mills, driven by 1,250-hp. motors through Smidth Symetro drives, were installed. New facilities for packing, bulk loading, and shipping were built.

Early in the year the company completed total modernization of the waste-heat power installation at the Crestmore, Calif., plant at a cost of $1,400,000. Now under construction is a $650,000 concrete office and laboratory building to be completed early in 1958.

Riverside, Hercules Cement Corp., and Peerless Cement Corp. recently merged to form a new company, American Cement Corporation.

Rochester The Rochester Portland Cement Co. is reported to have completed its dock, four 25,000-bbl. silos, and packing facilities in the port of Rochester, N. Y., at a cost of $1,000,000. This plant is expected to distribute in the United States a large part of the cement produced by the affiliated Lake Ontario Cement Co., whose new 1,800,000-bbl. $16,000,000 plant at Picton, Ont., is near completion. All silos at the Rochester and Picton plants were designed and built by the Macdonald Engineering Co. A distributing and packing plant is also being built on the waterfront near Toronto.

San Antonio The San Antonio Portland Cement Co., San Antonio, Tex., has announced an expansion program for probable completion late in 1958. Equipment to be installed includes a 10- by 220-ft. F. L. Smidth kiln.

South Dakota The South Dakota State Cement Plant, Rapid City, S. D., is expanding its capacity 2,500 bbl. daily by the installation of a new Allis-Chalmers 11- by 375-ft. kiln (replacing two old 10- by 150-ft. kilns), a new raw-grinding circuit with a 450-hp. rod mill and a 500-hp. ball mill—both Allis-Chalmers—and a 12,000-bbl. slurry storage under which is the new chemical laboratory. This work is being done by the Macdonald Engineering Co.; it will be completed about July, 1958.

Southern The Southern Cement Co., a division of America-Marietta Co., recently completed a 1,500,000-bbl. expansion program at its cement and lime operations at Roberta, Ala., at the same time increasing the output of chemical lime by 60 percent. The original cement plant, built in 1954, was a 1,000,000-bbl. operation. New equipment includes a 12- by 420-ft. F. L. Smidth kiln, a Traylor secondary crusher, two Allis-Chalmers grinding mills, and a 7- by 44-ft. Fuller horizontal air-quenching clinker cooler.

Standard Lime The Standard Lime & Cement Co., also a subsidiary of the American-Marietta Co., is adding a 10-silo cement storage with a capacity of 130,000 bbl. at its Martinsburg, W. Va., plant, slated for completion in March, 1958. These structures are being built by the Macdonald Engineering Co. This company early in 1956 completed a one-kiln, 1,400,000-bbl. wet process addition to its plant and is reported to be planning another similar expansion.

Standard Portland The Standard Portland Cement Co. (Diamond Alkali Co.), Painesville, Ohio, in 1957 completed an expansion program which increased its capacity by 1,000,000 to 3,000,000 bbl. annually. This included the conversion of a lime kiln to cement manufacture and the addition of electrostatic dust collectors, new raw and finish mills, and more slurry and clinker storage.

Texas The new 680,000-bbl. wet-process cement plant of the Texas Portland Cement Co. at Orange, Tex., went into operation in April, 1957. Oyster shell and clay are the raw materials used. Major equipment includes a 10- by 300-ft. kiln, an 8- by 20-ft., 2-compartment raw mill, an 8- by 60-ft. rotary clinker cooler, a 9- by 20-ft., 2-compartment finish mill, etc.—all supplied by Kennedy-Van Saun—and a 150-ft. diameter Dorr thickener.

It was recently announced that the capacity of this plant will be increased from 2,000 bbl. to 5,000 bbl. daily at a cost of $3,800,000. In-

cluded in the expansion will be a raw-grinding mill, an 11- by 400-ft. kiln, a finish-grinding mill, six additional silos, and two blending tanks. This equipment has been ordered from Kennedy-Van Saun and is expected to be in operation by July 1, 1958.

Universal Atlas The Universal Atlas Cement Co. in 1957 made substantial progress on its extensive plant expansion and improvement program. The big item was the completion late in 1957 of the new 3,000,000-bbl. plant at Buffington, Ind. Near completion is the expansion program at the Hudson, N. Y., plant. Scheduled for 1958 is some expansion of the Leeds, Ala., plant.

The additional plant at Buffington, Ind., is reported to have gone into operation late in 1957. This adds 3,000,000 bbl., for a total annual capacity of 10,000,000 bbl. at that location. New equipment includes three 9- by 80-ft. Traylor rotary driers, two 11- by 360-ft. Nordberg rotary kilns, five 11- by 17-ft. Nordberg ball mills—three raw and two finish—and a Fuller quadrant raw material blending system.

Slated for completion early in 1958 is the expansion program at the Hudson, N. Y., plant which will increase its capacity about one-third. Equipment being installed includes a 12- by 350-ft. rotary kiln and three 8-ft. 6-in. by 30-ft. Unidan mills for secondary grinding—all F. L. Smidth. Included will be provisions for making portland slag cement.

It is reported that customer acceptance of portland slag cement has been so good that six of the company's 11 plants will make this product. The Hudson, N. Y., plant will start production in 1958 and the Leeds, Ala., plant will do likewise late in 1958.

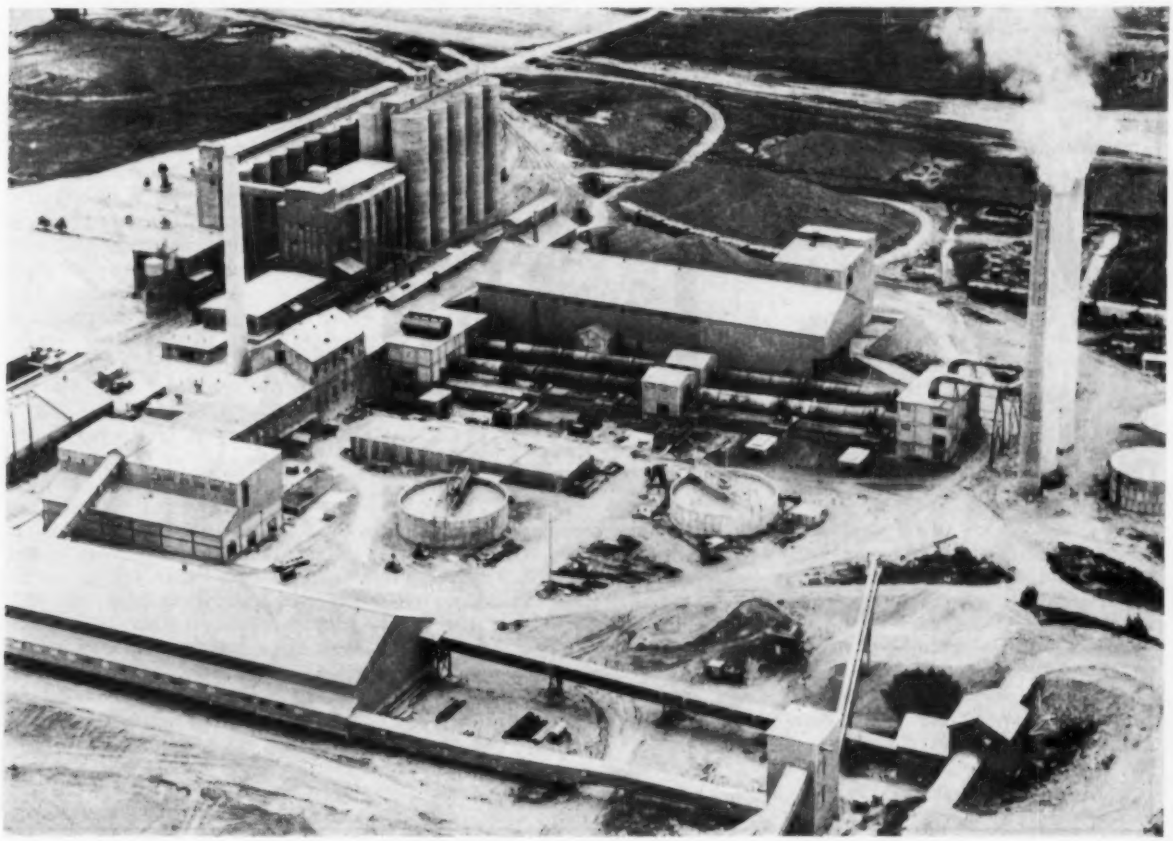
In November, 1957, a contract was awarded to the Rust Engineering Co. for new construction at the Leeds, Ala., plant. Equipment to be added will include a finish-grinding mill and supporting facilities for the production of portland slag cements, both regular and air-entraining types. This work will substantially boost capacity and is scheduled for completion late in 1958.

The company is reported to have acquired over 1,000 acres of limestone bearing land at Planks, near Rochester, Minn., as a plant site.

Capacity of the South Dakota State Cement Plant at Rapid City is being expanded 2,500 bbl. daily.

Volunteer The Volunteer Portland Cement Co., Knoxville, Tenn., is reported to have near completion an expansion program which will increase its capacity 40 percent to about 3,000,000 bbl. annually early in 1958. Included are new primary crushing, secondary crushing, and screening departments, storage buildings, a 10- by 300-ft. Allis-Chalmers kiln, an 8- by 41-ft. Allis-Chalmers raw mill, slurry basin, etc. This work is being done by the Macdonald Engineering Co.

Wyandotte The Wyandotte Chemicals Corp. Wyandotte, Mich., early in 1957 completed an expansion program started a year earlier which virtually doubled the former capacity of 1,200,000 bbl. annually. Included were facilities for the production of portland slag cement. Of the $2,500,000 invested, over $500,000 was for air pollution control, including electrical precipitators. New equipment includes Traylor primary and secondary crushers.



Review and Forecast

Aggregate Industries

In Healthy Condition

Face Future with Optimism

By BUREN C. HEROD

THE books have been closed on 1957 with an almost universaliv favorable ending in evidence for various segments of the aggregates industries. Information received during the final weeks of the year, from the annual survey conducted by PIT & QUARRY, indicate that many records were set successively in the preceding two years, and either maintained high levels or went on to new records in 1957.

With respect to the two primary groups—sand and gravel, and crushed stone—each attained a new peak in 1956. From the best available data, it appears that crushed stone, while slackening somewhat, still gained in 1957; and sand and gravel held closely to its existing high level.

Slag and most lightweight aggregates also set industry records during 1956 and are expected by authoritative sources to have maintained the pace during 1957. Agricultural limestone, which registered a gain of 7 percent during the preceding year, is expected to show a comparable increase for 1957 when final tabulations are established.

In line with the survey procedure followed in preceding years, detailed questionnaires were sent to several thousand aggregate producers in order to provide a nationwide cross section. Information was requested relevant to the years 1955, 1956, and 1957, and this data was then compared with the latest statistics (1956) compiled by the U. S. Bureau of Mines. The operators were also asked to indicate their expectations for the coming year and to comment on what effect the road program might have on their activities.

As pointed out in this section last year, the 1954 report of the Bureau of the Census provided the first definitive base in several years from which information supplied on subsequent surveys of producers could

The territorial breakdown of our survey data is based on the major divisions shown on this map.

be projected with expected greater accuracy. In addition, an improved coverage by the Bureau has proven advantageous in providing reference points for later survey compilations.

With the above factors present, the estimate made here last year on 1955 sand and gravel production (from projection of producers' data) was only 7 percent over the figure of 592,088,610 tons (commercial and non-commercial) given in the Bureau of Mines for 1955. The latter figure represents a gain of 6 percent over both quantity and value realized in 1954.

Last year's estimate of 1956 output was also high by a nominal percentage in comparison with the recently published figure in the U. S. Bureau of Mines report for that year. The tonnage reported to that agency was 625,382,474 (both commercial and non-commercial) and represented a gain of 6 percent over 1955.

Taking into consideration the data returned by producers on the questionnaires, and unofficial reactions of industry authorities, estimated output last year (1957) will range within a narrow band from 2 percent below to 2 percent above the 1956 production. It is apparent that there has been a levelling off during 1957, directly related to that recorded by new construction.

With respect to the coming year, a substantial percentage of the operators answering our survey look forward to an upswing. Only 4 percent have indicated that they anticipate a decline.

In regard to the crushed stone industry, the estimate made here last year on 1955 production, using producers' reports, was low by 5 percent. According to Bureau of Mines data for that period, the output was 367,000,000 tons. The producers were also conservative in their outlook for 1956 last year, and in lieu of the 4 percent gain anticipated, actually produced a record of 400,000,000 tons. The foregoing figures include commercial (exclusive of that used for cement and lime) and non-commercial production. Commercial operations accounted for 91 percent of the total 1956 tonnage.

In the light of the information furnished on the questionnaires, production in 1957 probably continued to rise, less steeply, and may show a gain of about 5 percent. This would indicate an output in the neighborhood of 420,000,000 tons.

As was the case last year, all sections of the country reported optimistically with respect to the coming year. On an overall basis, more than 75 percent of the producers reporting look forward to equally high output, or further gains of up to 22 percent. Significantly, at least one-fifth indicated plans for expansion.

Inland Sand & gravel Company's suction dredge with compartmented steel hull and 12-in. pump. A high-pressure water jet agitates the deposit.

As in the preceding two years, the survey questionnaires for this review were tabulated by the PIT AND QUARRY staff on the basis of geographic sectors that closely conform to market areas as delineated by the U. S. Department of Commerce. (See accompanying map.)

In addition to production figures for each of the three years, the survey forms completed and returned by the producers also provide, for the same annual periods, data from which comparisons may be drawn on such factors as selling prices, wages, hourly capacities, operating features, etc.

All returns received from the numerous producers surveyed are treated as confidential, as has been the case for the more than ten years that these detailed questionnaires have been distributed. Individual figures are not shown in this review but are used in developing national or regional averages.

SAND AND GRAVEL

These materials, although levelling off during 1957 from the climb of preceding years, maintained a high output, according to the survey returns. On a nationwide basis, the producers' estimates indicate that last year was within 1 percent of the production of 1956. Accordingly, output during the last 12 months was probably again about 625,000,000 tons, of which approximately 75 percent, or 470,000,000 tons, was of commercial origin.

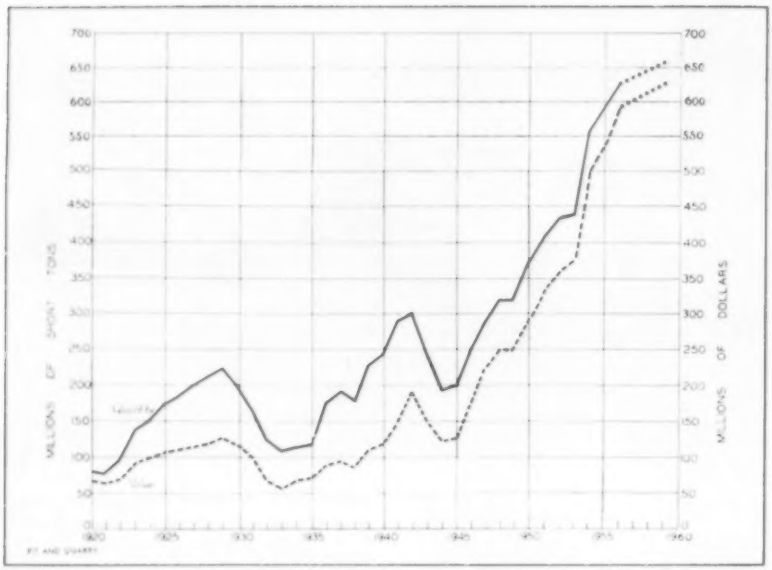
The potential for 1958, per producers' comments, is highly favorable. This takes into consideration an expected gain of about 5 percent in new construction put in place, as well as a greater actual construction factor in the interstate highway program. In view of the foregoing, it is quite possible that 1958 production will approximate 650,000,000 to 655,000,000 tons (both commercial and non-commercial).

By sections of the country, the survey returns provided an interesting comparison of activity in 1957 with the preceding year. While the West and North Central showed average decreases of 12 and 11 percent, respectively, the Northeast and Southeast indicated 11 and 8 percent gains. The Southwest maintained the balance between the above by holding about even with the prior year.

Without exception, all sections expect to realize gains during the coming year. Estimated increases cited by the operators range from 10 to 40 percent.

Hourly Capacity In line with the procedure followed in this survey during preceding years, hourly capacities are reviewed in terms of percent of change from previous reporting periods.

In 1957, all sections but one report increases, as follows: North Central—6 percent; Northeast—10 percent; Southeast—13 percent; and West—3 percent. The average hourly capacity as reported from operators in the Southwest was the same for both 1957 and 1956. However, the regional capacity was considerably greater, owing to several new plants that were placed in operation.



Production of sand and gravel in the United States, 1920-1957, including both commercial and non-commercial operations. Data through 1956 is adapted from the latest Bureau of Mines publications. Figures for 1957 represent estimates made on the basis of replies to the annual Pit and Quarry questionnaire survey.

Other averages developed from the survey returns concern equipment and operations. In regard to the average number of months of operation during the year, this turned out as 11. Year-round production was enjoyed by most plants in the Southwest, Southeast, and West, while the other sections, with different climate factors, had 9 or 10 operating months.

Use of portable plants were reported by 6 percent of the answering producers. The greatest proportion—by section—was in the North Central area. Approximately 50 percent of the plants surveyed are equipped with both scrubbing and crushing facilities, nearly 40 percent of the gravel processed—on a nationwide average—being crushed. Ten percent of the plants also incorporate grinding facilities.

With respect to excavating methods, 40 percent of the answering operators, have dry pits, 25 percent have wet pits, and 20 percent employ dredges. The greatest proportion of the latter was indicated in the Southeast.

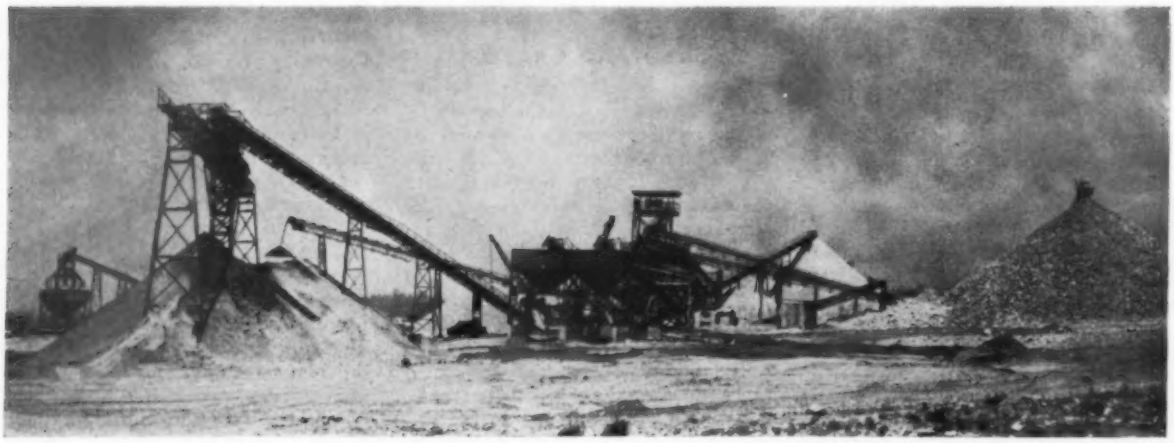
Selling Price Again, in 1957, the selling prices of sand and gravel were reported to have advanced. Sand, per operators' figures, went up 4 percent to an average of $1.15 per ton, and gravel prices rose 6 percent to $1.51 per ton.

The following percentages of change in sand prices were reported by the various sections: North Central—4 percent, to $1.02; Northeast—6 percent to $1.33; Southeast—5 percent to $1.08; Southwest—minus 2 percent to $1.11; and West—4 percent to $1.60. With respect to gravel prices, the Southwest also showed a decrease of 1 percent to $1.40, while the remaining sections indicated higher prices as follows: North Central—$1.38, up 5 percent; Northeast—$1.85, up 8 percent; Southeast—$1.35, up 3 percent; and West—$1.79, up 16 percent.

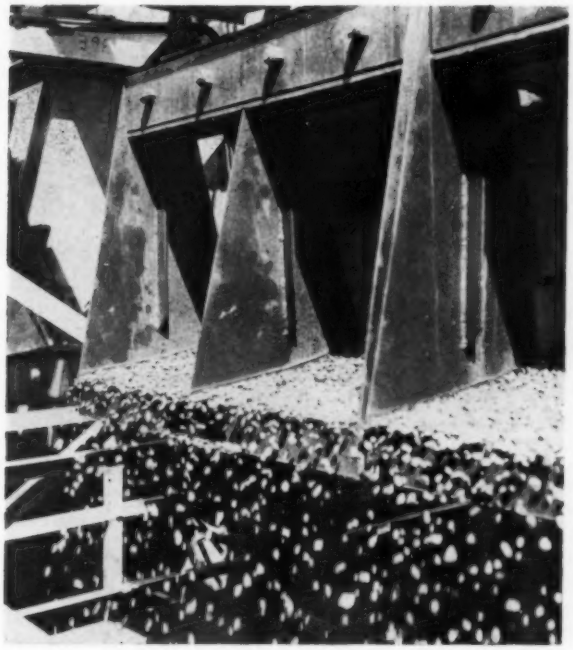
Wages Labor costs also registered an expected increase in 1957, and according to the producers surveyed, went up another 6 percent to $1.86. The West continued to lead with the highest average hourly wage—current figures showing $2.24, or an increase of 5 percent. In the same rank as the preceding year, the remaining sections reported these averages and increases: Northeast—5 percent to $2.10; North Central—7 percent to $1.82; Southeast—6 percent to $1.62; and Southwest—9 percent to $1.38.

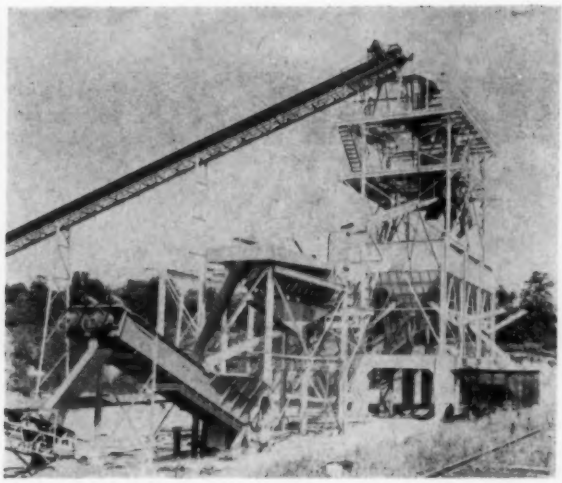
The Southwest is still well ahead of the rest of the country with respect to the average number of employees. That section had 88 per reporting company, while the Northeast and Southeast averaged 24, the West had 16, and the North Central averaged 15.

Outlook Such factors as the predicted gain in new construction cited elsewhere in this annual review and increasing activity in actual construction in the inter-



Low-level design and construction exemplified by the new sand, gravel, and crushed material plant of Canyon Rock Products. The facility is located in Upland, Calif.





Above: A view showing detail of the screen tower and sand processing equipment of State Sand & Gravel's plant, North Lake, Wis.

Left: The vibratory feeders in the new elastic fractionation beneficiation plant of Whittaker & Gooding, near Ann Arbor, Mich. They are set to deliver stones in a single layer and so that the material will fall in a designed pattern onto impact plates.

state highway program is probably reflected in the optimistic comment of the producers surveyed recently. In view of the above, there is strong support for an estimated 650,000,000-ton output, as noted previously.

Compilation of figures furnished by the operators themselves shows that nearly 40 percent expect to show gains of at least 20 percent during the coming year. That attitude is accompanied by plans for expansion, modernization, and other improvement efforts.

Approximately 40 percent of those companies planning to expand their operations have indicated they will do so through the erection of new plants, the acquisition of portable units, or the addition of pit or processing equipment. Further, another 37 percent plan to revamp existing pit or plant equipment to achieve greater productive capacity.

Although a substantial number of producers in all sections entertained a favorable outlook, the greatest proportion in any given section was in the Southeast, where 38 percent anticipated increased activity. One-third or more of the operators in the North Central, Northeast, and Southwest had similar views, while 18 percent in the West had optimistic comments.

An average of more than $40,000 was reported by those companies who plan expansion and revision programs as the expected expenditure in reaching their goals.

Increased construction activity in the road program was cited by a number of producers as representing a dominant factor in future plans. As a direct consequence, those companies indicate that demands of that program in their specific areas will require expansion ranging from 30 to 100 percent. However, it is interesting to note in contrast to the widespread and colorful publicity attending the road program that an average of 55 percent of the operators reporting from all sections indicate they expect that far-flung construction effort to have little or no effect on their activities.

1956 Statistics As noted previously, the 1956 sand and gravel production reported to the Bureau of Mines totalled 625,000,000 tons (commercial and noncommercial), valued at $596,000,000. Commercial operations accounted for approximately 75 percent, or 470,000,000 tons.

Approximately 212,000,000 tons, or 45 percent of the commercial sand and gravel production, was consumed in building, while 42 percent, or 196,000,000 tons, was used in paving. Each category registered an increase over the preceding year.

Repeating its performance of preceding years, California was the leading producer and accounted for more than 86,500,000 tons—over twice the tonnage produced by the second leading state, Michigan. Output from the latter was 42,150,000 tons. The remainder of the ten leading states in order of production were: Illinois, Ohio, Texas, Minnesota, New York, Wisconsin, Washington, and Indiana. Collectively, this group accounted for more than half of the total production in the country.

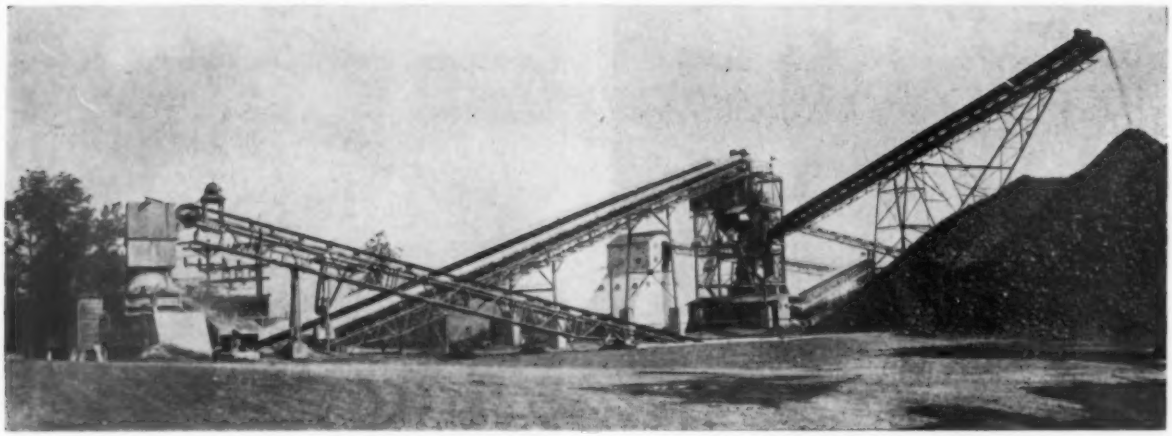
A trend toward truck transportation increased during 1956, when 80 percent of all sand and gravel was transported by these means. In 1955, 77 percent was so moved. About 13 percent was hauled by rail, and another 4 percent was transported via waterways.

N.S.G.A. Survey The latest annual survey conducted by the National Sand and Gravel Association covered 1956. This report, reviewed in the August issue of PIT AND QUARRY, p. 94, covered questionnaires returned by 551 companies operating 922 plants.

CRUSHED STONE

On the basis of survey returns submitted by producers last year, it was estimated here at that time that production of crushed stone in 1956 would approximate 365,000,000 tons. In view of the final Bureau of Mines statistics for that year, the operators were conservative in their reports, since a 400,000,000-ton commercial output (exclusive of stone used for cement and lime) was realized.

Although a gain of 5 percent had been predicted over 1955, the actual increase was nearly double that amount. According to the produc-



A general view of the crushing plant of the Edward Balf Company. Located at Newington, Conn., the plant produces more than 800,000 tons of trap rock aggregates annually.

ers' reports received in the latest survey, the pace slackened somewhat in 1957, although, as noted earlier, production probably reached 420,000,000 tons.

With the exception of the North Central section, which apparently produced at about the 1956 level, operators in all parts of the country indicate output last year in greater amounts than in the preceding annual period.

Hourly Capacity A nationwide average of hourly plant capacity developed from figures furnished by surveyed companies shows a gain of slightly more than 10 percent in 1956 over the prior year. With the exception of the West, all sections reported increases as follows: North Central—8 percent; Northeast—20 percent; Southeast—19 percent; and Southwest—35 percent.

Again on a national average, the plants reporting have operated 11 months out of the year. The average periods by section were: Northeast—10; North Central—11; Southeast—11; Southwest—12; and West—11 months.

Selling Price The value per ton, on a countrywide basis, advanced by only a nominal percentage to $1.69, according to survey reports. With the exception of the Southeast, where $1.90 was the average in both 1956 and 1957, all other sections reported increases with percent of gain and averages as follows: North Central—1 percent to $1.42; Northeast—2 percent to $1.90; Southwest—2 percent to $2.00; and West—5 percent to $1.82.

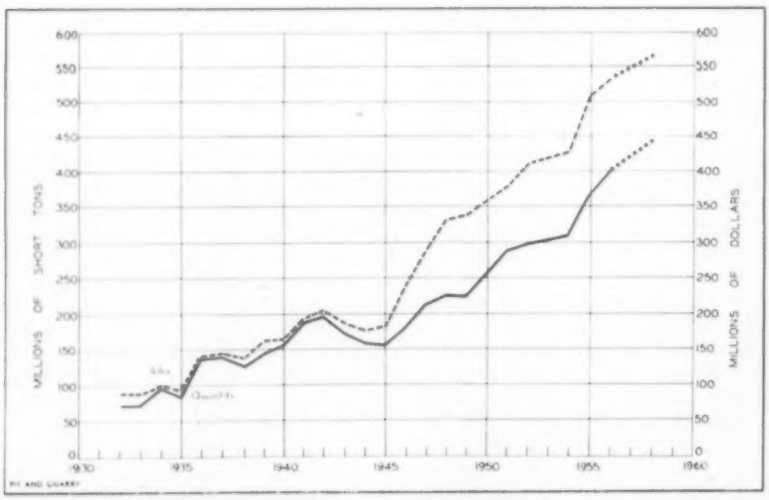
Wages Per operators' figures, hourly wages maintained the steady increase of the last several years and, on a national average, rose another 6 percent to $1.69. Hourly rates reported by the various sections, by decreasing scale, were: West—$2.40; North Central—$1.73; Northeast—$1.72; Southeast and Southwest—$1.40 each. All sections reported increases in hourly labor cost.

The overall average number of employees per company was lower, however, in 1957. According to the survey questionnaires, the average now is 30 men. In each section of the country the average was under that given in the preceding year. The current figures showed the North Central to have an average of 17 employees per company, 42 in the Northeast, 30 in the Southeast, 26 in the Southwest, and 34 in the West.

Outlook Optimism concerning the coming year is widespread among the crushed stone producers, as evidenced by the fact that 40 percent of those reporting on our survey anticipate greater demands for their products. Estimates of gains range from 15 to 25 percent, the average being about 22 percent.

Less than 10 percent expect to experience a drop in the market, while another 37 percent indicate that production will at least remain at its current high level.

By section, the average increase expected was as follows: North Central—17 percent; Northeast—20 percent; Southeast—25 percent; Southwest—25 percent; and West—20 percent.



Production of stone (including crushed, broken, and dimension) in the United States, 1932-1957 (includes both commercial and non-commercial, but excludes that used in manufacture of cement and lime). Figures through 1956 are based on Bureau of Mines data, those for 1957 are developed from replies to the latest questionnaire survey.

As a corollary to the above optimistic outlook, a large number of producers entertain plans for expansion of facilities. About 10 percent expect to build new permanent plants or acquire portable units, while another 32 percent expect to add pit and processing equipment. Revamping of existing pit and plant facilities will be undertaken by an additional 21 percent.

On a nationwide basis, the average expenditure anticipated for expansion and modernization is $55,000. Some companies have indicated possible expenditures of up to $1,000,000.

Among the crushed stone producers, a percentage almost identical to that in the case of sand and gravel operators expect the road program to have little or no effect on their operations. However, 20 percent who expect to be in active participation indicate that demands for aggregates will require them to expand from 10 to 200 percent. Approximately 10 percent will build new plants, according to the survey reports.

1956 Statistics The new production record of 504,000,000 short tons produced in 1956 was valued at $689,000,000. Commercial operations, exclusive of those producing stone for use in manufacture of cement and lime, accounted for approximately 400,000,000 tons.

More than half of the latter amount was represented by crushed and broken stone used for concrete aggregates and roadstone. Limestone and dolomite constituted 75 percent of the total crushed and broken stone produced.

Pennsylvania, Michigan, Ohio, California, and Illinois were the five leading states, each producing more than 30,000,000 tons.

AGRICULTURAL LIMESTONE

In addition to the latest annual figures available at this time (1956), covering application of agricultural limestone, comments have also been received from industry authorities on the estimated consumption during 1957, as well as prospects for the coming year.

The downward trend from the peak year of 1947, as reported here in preceding reviews, reached its lowest point in 1954. As noted last year, the 1955 usage gained approximately 9 percent over the preceding year, and 1956 final statistics show a continuation of that encouraging rise, citing a total of 22,021,393 tons. This was an increase of 7 percent over 1955 and was about 1,000,000 tons more than the estimated figure furnished to PIT AND QUARRY for last year's review.

Significantly, during the low year of 1954 almost all states required soil tests as a prerequisite to payment for agstone applied under ACP practices and programs. Since that time, 24 states have eliminated that mandate, and during both succeeding years, agstone use registered substantial increases.

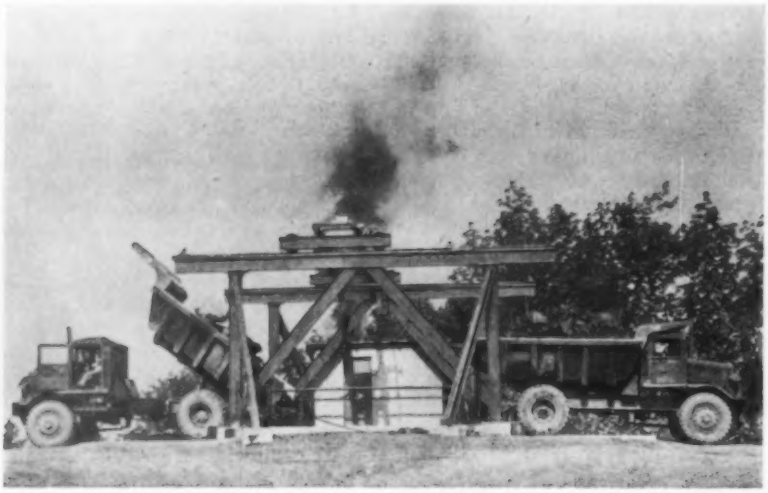
Of the 41 states reporting agstone application during 1956, 27 have indicated increases ranging from 1 to 88 percent. The remaining states report decreases of a fraction of 1 percent to 45 percent. However, the greatest drop was registered by Wyoming, which used only little more than 1,000 tons, while in Tennessee, which showed the 88 percent gain, over 570,000 tons were applied.

In view of the above factors, and with consideration given to variations in ACP activity, industry sources appear confident that 1957 should record an increase in agstone consumption comparable to that of the preceding year. In that event, approximately 23,000,000 tons will have been applied.

A forecast for the coming year is unusually difficult owing to the uncertainty surrounding such important factors as government conservation programs, and further complications are provided by individual state participation. However, it is expected by those closest to the situation, that there will be a leveling off during 1958.

Illinois maintained its status during 1956 as the leading state in agstone consumption, with 2,903,674 tons—13 percent of the total—ap-

An overall view of the new Elm City, N. C., plant and quarry of Bryan Rock and Sand Co.



Two trucks simultaneously dumping 20-ton loads of traprock into the hopper of the 500-t.p.h. capacity primary crusher at the Edw. Balf Co. plant.

plied to its soils. Indiana again held second place, with 2,548,310 tons, or about 12.5 percent of the total. The balance of the top ten states, in order of rank, were Missouri—2,103,772 tons, 9.5 percent; Ohio—1,995,981 tons, 9 percent; Wisconsin—1,601,429 tons, 7 percent; Iowa—1,527,304 tons, 7 percent; Kentucky—1,370,634 tons, 6.5 percent; Pennsylvania—993,709 tons, 4.5 percent; New York—691,468 tons, 3 percent; and Tennessee—577,650 tons, 3 percent.

SLAG

Statistics compiled from the annual canvass co-operatively conducted by the Bureau of Mines and the National Slag Association show that the iron blast-furnace slag industry again set a new record during 1956. Despite a halt of several weeks in production caused by a strike in midyear, 35,000,000 tons, valued at nearly $50,000,000, were produced—the largest in the industry's history. The tonnage and value represent gains of 8 percent each over those respective items in 1955.

Data supporting the above include production figures of 45 companies operating 65 plants processing air-cooled slag, 19 plants that process granulated slag, and 21 plants producing expanded slag.

A breakdown of the total output indicates that 73 percent was comprised of screened air-cooled slag, 6 percent unscreened air-cooled, 13 percent granulated, and 8 percent expanded. The foregoing percentages closely parallel the respective ratios of preceding years. In each case there was an increase over the corresponding category in 1955, with unscreened air-cooled and granulated slags showing more than 50 and 20 percent gains, respectively.

About 92 percent, or 23,522,678 tons of the major product—screened air-cooled slag—was consumed as follows (in order of rank): highway and airport construction—other than in portland cement concrete and bituminous construction; bituminous construction, all types; railroad ballast; portland cement concrete construction; and manufacture of concrete block. Other uses included mineral wool, roofing, sewage filtration, etc.

With respect to unscreened air-cooled slag, approximately 60 percent was used in highway and airport construction. Hydraulic cement manufacture and concrete block production accounted for 44 and 90 percent, respectively, of granulated and expanded slag output.

As in previous years, the leaders among the 15 states in which iron blast-furnace slag is produced were Ohio, Pennsylvania, and Alabama. Individually they accounted for 23, 23, and 16 percent, respectively, of the total. The remaining 38 percent was produced in California, Colorado, Illinois, Indiana, Kentucky, Maryland, Michigan, Minnesota, New York, Tennessee, Texas, and West Virginia.

Truck transport handled 64 percent of the shipments during 1956, while 34 percent was carried by rail. The balance was shipped *via* waterways.

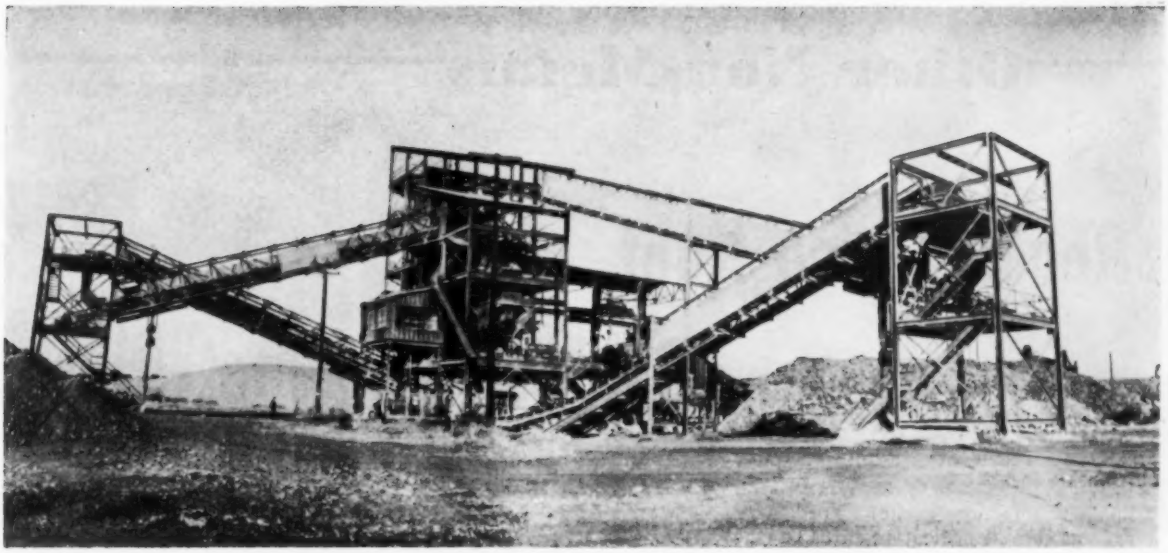
The estimate furnished by industry sources at this time last year concerning the production for 1956 was very accurate. These same sources believe that production during 1957 and that in the coming year will be about the same as the record output of 1956. This belief is based on the fact that the industry is already utilizing the maximum output of the iron blast furnaces in many areas.

LIGHTWEIGHT AGGREGATE

A companion survey of block producers that appears in our sister publication MODERN CONCRETE, shows that an average 49 percent of the entire concrete masonry output in 1957 was produced with lightweight aggregates. This is virtually the same proportion as in the preceding two years.

Concrete masonry producers' reports show that 1957 output was somewhat under the 1956 level. Nevertheless, on the above percentage of total production, lightweight

An overall view of Albany Limerock Corporation's closed-circuit scalping, crushing, and screening installation at Albany, Ga.



Crushing and screening operations, and transfer towers, of the Morrisville, Pa., slag processing plant of the Warner Company.

aggregates were used in more than 1,000,000,000 units. Over 72 percent of all companies reporting on the concrete masonry survey stated that some proportion of lightweight aggregates were used in their operations.

A fair estimate of the quantity of these materials used in 1957 would be about 17,000,000 cu. yd.—a nominal drop from the record of the preceding year. This is based on an average yield—from data submitted by the producers—of approximately 61 blocks (8-in. equivalents) from a cu. yd. of lightweight aggregate.

A breakdown of the figures furnished by the operators shows expanded slag as the leading material at 28.5 percent of all lightweight aggregates used, followed by expanded sale or clay—22 percent; cinders—21 percent; pumice—15 percent; and expanded slate—14 percent.

In view of the optimism held by concrete masonry producers with respect to the coming year, lightweight aggregates consumption should climb. More than 40 percent of the companies reporting have expressed the belief that 1958 will show an increase in output, with the nationwide average at about 22 percent.

Expanded Slag During 1956 the output of expanded slag continued its climb and at 2,990,177 tons exceeded the previous year's record by 3 percent. The value, at $8,495,818, was 7 percent greater than in 1955.

About 90 percent of this material was used in the manufacture of lightweight concrete masonry. Another 96,000 tons found its way into lightweight concrete.

Vermiculite According to the latest Bureau of Mines statistics for 1955 and 1956, the production of crude vermiculite (cleaned and screened) was 192,628 tons, valued at $2,542,467 in 1956—a drop of 6 percent in both tonnage and value from 1955. The latter year had shown a 4 percent gain over 1954, when 195,538 tons had been produced, as reported here two years ago. The 1956 output was not quite 2 percent less than in 1954. Montana and South Carolina were the only two producing states during 1956.

With respect to exfoliated vermiculite, 158,787 tons were produced in 1956—slightly more than in 1955. The average value per ton dropped, however, from $63.31 to $60.93. The material was processed by 25 operators in 55 active exfoliating plants. This was one more in each category than in the preceding year.

According to authoritative industry sources, the total volume sales of vermiculite continued at a high level during 1957 and is expected to show an increase over 1956, when final results are in. A large part of the increase is described as being attributable to the use of vermiculite concrete aggregate. In northern areas of the nation, newly designed roof assemblies using precast vermiculite concrete tile with prestressed concrete members has shown great promise for cold weather construction, it is reported. Present prospects for 1958 are said to be very favorable, with a brisk pace in construction such as schools, churches, hospitals, etc., predicted. Even if new residential construction does not exceed the present level, it is regarded as a large market for vermiculite fill insulation.

Perlite The optimism of industry members reported here last year concerning production and sales of perlite during 1956 was far surpassed by the figures actually attained. The 350,224 tons of crude mined was the latest record in a ten-year performance that has shown a gain each succeeding year.

Sales of screened and sized crude were reported to be 310,800 tons, valued at $2,550,000, while expanded perlite sales were 263,627 tons, valued at $13,122,000. This represented an increase of 9 percent in crude tonnage, and a 7 percent gain in expanded material sales.

The entire output of crude for the year was produced by 12 operators with 14 mines. There were 3 more expanding plants in operation, for a total of 84.

An analysis of use reported in Bureau of Mines reports shows these percentages: 76—plaster aggregate; 10—concrete aggregate; 6—oil well drilling muds and cementing; 2—filter aids; and 6—miscellaneous uses, including loose fill insulation, paint filler, refractory brick, and oil absorbents.

Among the ranking states in production of expanded perlite were California, Illinois, New York, Pennsylvania, and Ohio.

Record Pace Kept By Many Nonmetallics

By BUREN C. HEROD

PRODUCTION data on nonmetallic minerals—exclusive of aggregates and cement reported on elsewhere in this review and forecast—show many new records in the final reports for 1956 and for varying periods of 1957 on some commodities, as prepared by the U. S. Bureau of Mines.

With respect to those which, during the last year, have dropped from previous high production rates, most have not been far off earlier records, and apparently reflect more of a levelling off than a downward trend.

While final 1957 data is not available on any nonmetallics at present, the latest quarterly Bureau of Mines reports have been drawn upon for this writing. The 1956 statistics are available, however, on all the commodities referred to below. Tonnage tabulations have been completed for a part of 1957 on these minerals: lime — nine months; gypsum — six months; sulfur—nine months; and fluorspar—three months.

As anticipated in this review last year, the peaks established by many industries in 1955 were surpassed in 1956. In the case of lime, the latter year registered an all-time high in output, and there is strong evidence from the partial 1957 production figures at hand that another record is within reach. During the first three quarters of 1957, output was about 2 percent ahead of the same period of the preceding year. This would indicate a possibility of open-market sales in the neighborhood of 9,300,000 tons.

Among all the nonmetals on which production data is detailed below, only gypsum, sulfur, and fluorspar registered decreases during various periods of 1957 from the comparable quarters in 1956. Actually, gypsum did not maintain the record pace of the first six months of 1956 for the balance of the year, and as of June, 1957, was still dropping somewhat. Nevertheless, the decrease was directly related to the 10 percent drop in construction of new dwelling units; and in view of the predicted 6 percent gain for the coming year in that type of construction, this commodity will undoubtedly recoup.

The decrease recorded by sulfur during the first nine months of 1957 was largely a matter of equalization between supply and demand. As a consequence in large part of the record production in 1956, producers' stocks are at a high level, and the industry has probably leveled off after its slight decrease.

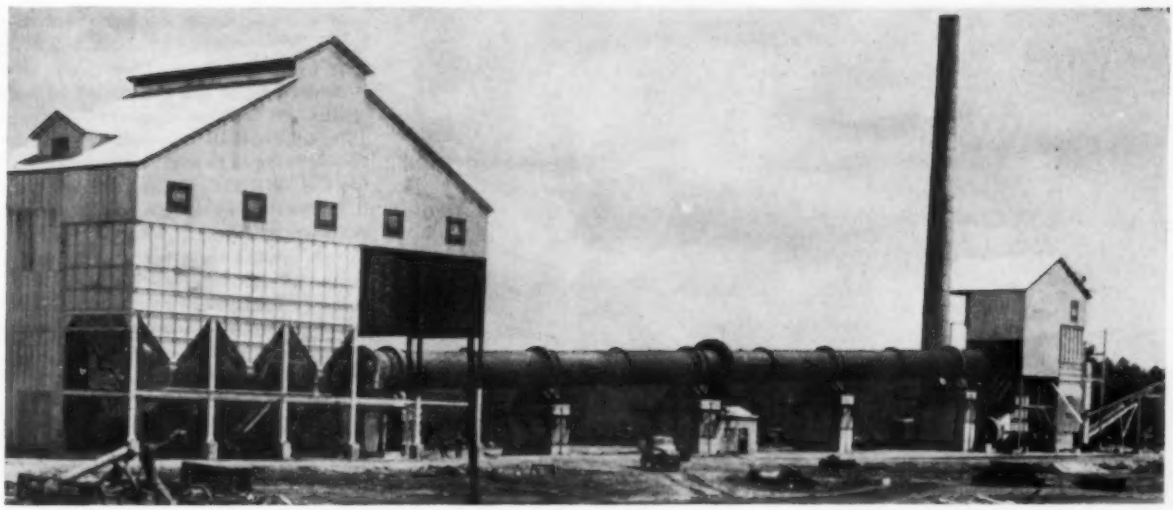
After setting a new production record in 1956, the fluorspar industry has undergone a decrease in the first quarter of 1957—the latest period for which data is available. Future activity in the industry will be directly related to the solution of a number of difficult factors, including the development of hard - to - locate reserve deposits, rising costs, foreign competition, etc. (See PIT AND QUARRY, December, 1957, p. 104.)

With respect to virtually all other commodities considered in this review, no final statistics later than 1956 are available. Those data, however, reflect a healthy condition in every instance.

In 1956 the phosphate industry not only offset the drop recorded in 1955 (due to a lengthy strike) but had also gone on ahead to a new peak. Potash maintained its steady climb with another 4 percent gain over the previous 1955 record. Feldspar set new highs in both tonnage and value for crude production, and kyanite rose another 12 percent in sales of domestic materials. The mica industry recorded the largest quantity of sheet mica sold or used by producers for any annual period in its history. Among the clays, kaolin, fire clay, ball clay, and bentonite all set new production and use records, or maintained existing high

LIME SOLD OR USED BY U. S. PRODUCERS 1955-56

	Quicklime	Hydrate	Total 1956	1955
Agricultural:				
Sold	96,048	155,857	251,906	304,254
Used	80	49	129	1,163
			252,035	305,417
Building:				
Sold	123,918	1,009,465	1,133,383	1,232,664
Used	54,890	14,732	69,622	77,110
			1,203,005	1,309,774
Chemical, Industrial:				
Sold	4,425,146	791,738	5,216,884	5,327,849
Used	1,267,057	214,406	1,481,463	1,407,928
			6,698,347	6,735,777
Refractory:				
Sold			2,401,966	2,065,036
Used			21,943	63,924
			2,423,909	2,128,960
			10,577,296	10,479,928



United Cement Company's new rotary kiln lime plant near Montevallo, Ala.

levels. A new peak was attained by both talc (including soapstone and pyrophyllite) and barite, while boron minerals reached the highest level since 1952.

In view of the above impressive records, which reflect steady progress and not sporadic spurts, it is logical to assume that the performance in 1957 and for the coming year will indicate a high level of activity, or show further steady gains.

Lime At this time, the preliminary figures covering the lime sold during 1957 are compiled only for the first nine months, or through September. On the basis of those figures, tabulated by the Bureau of Mines, lime sold in those three quarters is about 2 percent ahead of the same period quantity of 1956. If this gain remains constant for the balance of the year, the industry will set a new record of approximately 9,300,000 tons (open-market) according to industry sources.

As of the end of September, lime sales stood at 6,877,825 tons as compared with 6,763,832 tons at the same time in 1956. A breakdown of this sales tonnage shows that 79 percent was in the form of quicklime, and the balance in hydrate. These percentages are almost exactly those recorded in earlier years.

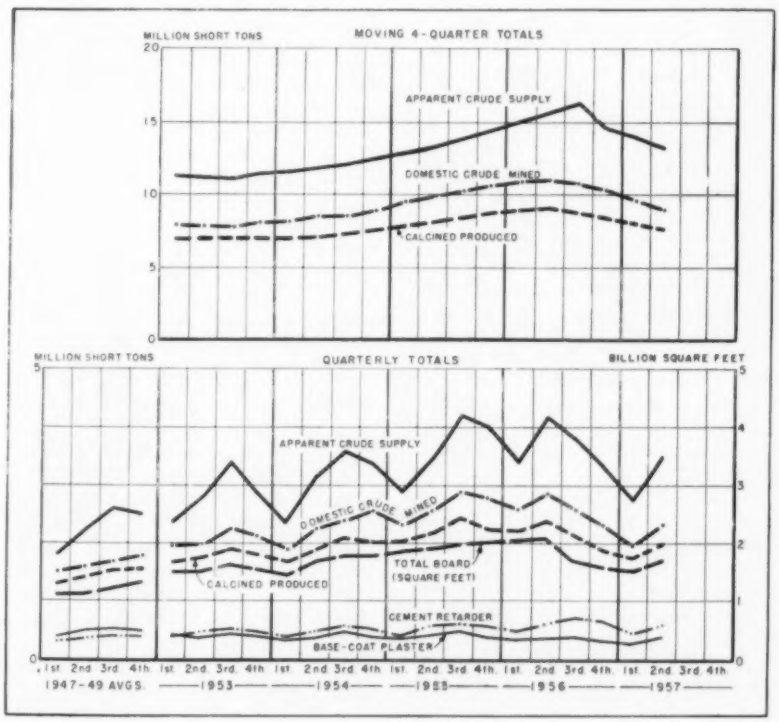
An analysis of usage shows, in order of rank, the following percentages: chemical and other industrial —59 percent; refractory (dead-burned dolomite) — 26 percent; building—12 percent; and agricultural—3 percent. Again, these proportions are virtually identical to those of 1956.

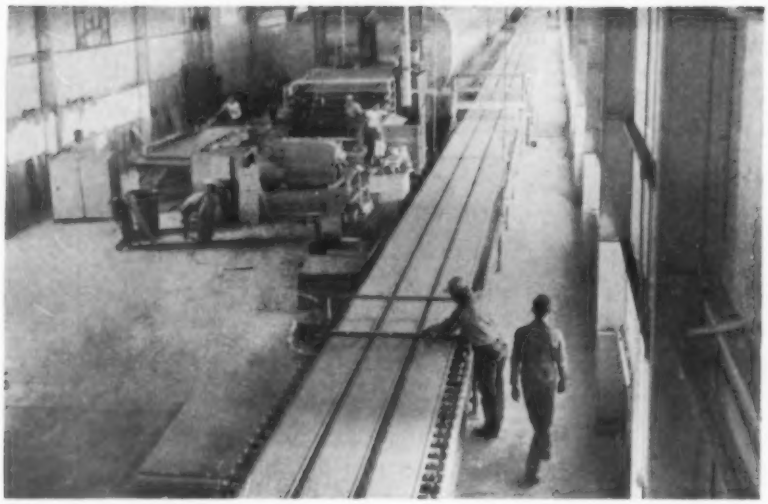
However, consumption in the agricultural and building categories was off 9 and 6 percent, respectively, from the 1956 figures, while chemical-industrial and refractory uses were registering gains of 2 and 7 percent over the comparable 9-month period of 1956.

Bureau of Mines statistics published on October 1, 1957, covering the full year of 1956 are shown in the accompanying table. According to producers reports to the Bureau, the output for the year increased 1 percent over 1955 and set a new high of 10,577,296 tons. Of this amount, 9,004,139 tons was reported as open-market sales and also represented a 1 percent gain over the earlier year. Of the total sold and used, 56 percent was quicklime, 21 percent hydrate, and 23 percent dead-burned dolomite.

In regard to prospects for 1958, industry representatives have reported favorably and apparently expect the industry at least to equal

Trends in the gypsum industry, 1953-1957.





Union Gypsum's board products plant at Phoenix, Ariz.—the first board and lath facility in the state.

the performance of 1957. Qualifying factors naturally include activities in the building and steel areas. The market for lime stabilization is showing considerable vigor, consumption during 1957 being double that of the preceding year. If growing demands can be met, it is expected that 240,000 tons of lime (primarily hydrate) will be used in stabilization work during 1958—triple that used in 1956.

Gypsum Domestic mine production of crude gypsum during the first six months of 1957, as reported to the Bureau of Mines, was 19 percent lower than during the comparable period in 1956. Respective tonnages were 4,281,614 (1957) and 5,299,408 (1956). Calcined gypsum, considered the most accurate overall measurement of activity in the industry, totalled 3,769,789 tons, or 18 percent less than in the first two quarters of 1956.

The first break in the existing climb became apparent in the last two quarters of 1956. Although the January-September, 1956, production—as reported here last year—was ahead of previous records, the fourth quarter output fell off. Final production (crude) reported for the year was 10,312,784 tons or about 6 percent less than the 11,000,000 tons predicted here.

In view of the above, it is probable that final figures for crude mined and calcined gypsum in 1957 will drop from 5 to 10 percent below the 1955 records.

According to the 1957 report on the first six months, all gypsum materials except agricultural gypsum, fillers (and unclassified calcined), roof deck plasters, and other building plasters were produced in lesser quantities.

Lath and wallboard, the two largest categories of consumption, registered drops of 29 and 17 percent, respectively.

While domestic production was slowing during the period, imports also dropped 9 percent from those of the first six months of 1956. As a consequence, the apparent supply of crude was 6,206,343 tons—16 percent lower than in the comparable quarters of the preceding year.

Despite the foregoing, producers reports of crude production for the full year of 1957 will probably exceed 8,000,000 tons—for the seventh successive year. In addition, lath and wallboard production may reasonably be expected again to exceed 7,000,000,000 sq. ft.

The 10 percent drop in new residential construction registered last year is obviously reflected in the details on gypsum products given above. However, in light of the increase expected during 1958 in various construction categories, the gypsum industry may well recoup more than half of the decline experienced during 1957.

Sulfur By the end of September, 1957, the domestic sulfur industry had produced 4,111,527 tons of native sulfur (Frasch). This nine-month total was 15 percent off the pace of the comparable period of 1956. Owing to the fact that shipments and apparent sales were each down about 12 percent, producers' stocks had risen by nearly 17 percent.

The production of recovered elemental sulfur (97 percent plus purity) had, however, risen 7 percent over the output in January-September, 1956, and stood at about 382,000 long tons.

According to the Bureau of Mines report, it became apparent during 1956 that sufficient supplies of sulfur were available to meet high demands. Of the 7,818,000-ton total produced, 83 percent was native sulfur and 6 percent recovered material. Producers' stocks were at a comparable peak and amounted to 4,056,000 long tons (Frasch and recovered)—a 2 percent gain over the preceding year.

Fluorspar During the first quarter of 1957, domestic crude mine production of fluorspar amounted to 164,700 tons. Of this quantity, 193,200 tons were processed to recover 62,100 tons of finished fluorspar. Domestic production and shipments of metallurgical grade material accounted for 9,700 and 9,800 tons, respectively, of the latter amount, and were about 32 and 52 percent lower than the same categories in the first quarter of 1956. Illinois, Kentucky, and Tennessee provided about 85 percent of the metallurgical shipments, and the balance originated in Montana, Nevada, and Utah.

Final statistics for 1956 show that fluorspar consumption reached a new record of 621,354 tons. This is reported to be due to increased usage in the hydrofluoric acid and steel industries. Domestic shipments had also shown a rise, and were 18 percent higher than in 1955. Imports, however, were also up to a new record, and were meeting an increasing proportion of domestic demand.

Phosphate In reversal of the drop experienced by the phosphate rock industry in 1955, when mine production was down to 39,670,598 tons, the year of 1956 established a new record of 52,198,375 long tons—a 32 percent gain over the preceding year. Marketable production amounted to 15,746,781 long tons with a P_2O_5 content of approximately 5,000,000 long tons.

The new records for mine and marketable production, while 32 and 28 percent higher, respectively, than in 1955, are actually indicative of a more steady growth than it appears. For example, 1956 marketable production, while 28 percent higher than in 1955, is 14 percent higher than 1954, the previous record year. A prolonged strike in the Florida fields during 1955 contributed greatly to the decrease recorded in that year. In the absence of that labor difficulty, 1955 would undoubtedly have represented another link in the years of steady annual gains.

With respect to marketable production data for separate states and areas, both Florida and Tennessee offset the drop in 1955 to arrive at new highs of 11,822,145 and 1,685,003 long tons, respectively. The Western states, which had not experienced a loss of production in 1955, continued their gains by another 9 percent to a total of 2,239,633 long tons in 1956.

With the marketable production cited above, Florida accounted for 75 percent of the national total. The output of Tennessee represented 11 percent.

Potash Continuing its steady upward trend, the potash industry reached another new peak in 1956, when 3,678,834 tons (2,171,584 tons K_2O equivalent) of marketable potassium salts were produced. This represented a gain of 4 percent over the previous record of 1955.

Sales were also up 4 percent in comparison with the preceding year, and apparent consumption remained at about the same high level. Producers' total sales, at $79,751,000, represented an average value of $22.33 on the 3,571,405 tons sold. Apparent consumption of 3,507,802 tons was only about 2 percent less than production.

To avoid disclosure of individual company figures, the Bureau of Mines has discontinued, beginning with the 1956 report, publication of production detail on the various grades and types of potassium salts. However, it has been reported that the 60-62 percent muriate of potash continues as the major item of potash material production.

The greatest proportion of domestic production was again provided by New Mexico, from which 92 percent of the total output was derived. California and Utah contributed the bulk of the remainder. Development of a new mine and construction of a new refinery in New Mexico by the National Potash Company were apparently completed early in 1957.

Feldspar All-time highs in tonnage and value were recorded for crude feldspar production in 1956, according to producers' reports to the Bureau of Mines. A total of 622,429 long tons of crude (including flotation concentrate) were sold or used by producers during the year. This represents a 34 percent rise over the 1955 figure of 465,378 tons. The latter statistic was not available at the time of this writing last year. At $5,763,847, the value of crude production in 1956 was 50 percent higher than in 1955.

Ground feldspar sold by merchant mills in 1956 also increased in quantity and value—by 43 and 18 percent, respectively—over 1955.

Among the major producing states, North Carolina, California, Colorado, and South Dakota, in that order, showed the greatest output. North Carolina alone accounted for 41 percent of the total crude output and gained 5 percent over 1955.

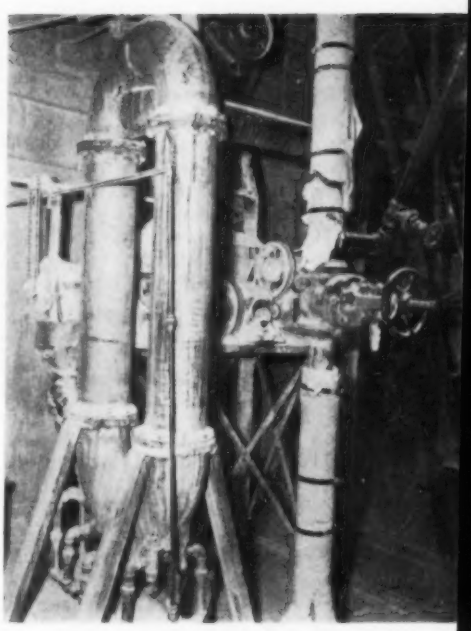
Kyanite Domestic production of this commodity showed an increase of about 18 percent in crude and about 6 percent in refined material in 1956. Sales of the domestic material increased about 12 percent in quantity and 18 percent in value during the same period.

Imports for consumption during 1956 dropped 8 percent from the previous year. This was largely owing to the availability of high quality synthetic mullite.

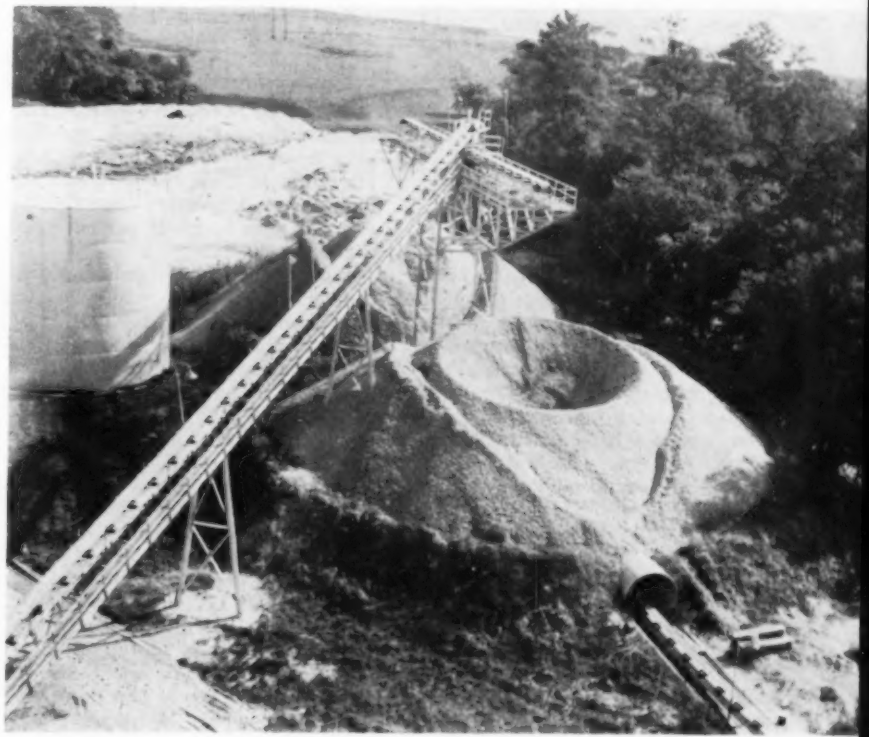
In view of the fact that there are only two domestic producers—Commercialores, Inc., working deposits near Clover, S. C., and Kyanite Mining Corporation, operating near Cullen and Dillwyn, Va. (see PIT AND QUARRY, September 1957, p. 118)—individual mine production statistics cannot be divulged.

Graphite During 1956, the world production of natural graphite decreased 7 percent, owing

The smallest known micron sizes of talc are yielded by this fluid-energy mill of Southern California Minerals Co., at Ogden, Utah.



Seen from the top of Bird & Son's roofing granule plant near Charleston, S. C., the raw material piles resemble dormant volcanoes.



to a 32 percent drop in production of amorphous graphite in the Republic of Korea. Domestic consumption of natural graphite also decreased 11 percent, according to consumers' reports.

Southwestern Graphite Company, Burnet, Tex., is still the only producer of crystalline flake graphite in North America; and Graphite Mines, Inc., Cranston, R. I., was the sole producer of amorphous graphite in the United States.

Imports for consumption decreased 2 percent in quantity from 1955, and exports also decreased, from 1,394 to 1,062 tons.

Mica Final statistics for 1956 show that the largest quantity of crude sheet mica sold or used by producers on an annual basis was recorded in 1956. The quantity—887,871 lb.—was 38 percent higher than in 1955, and represented the highest point since 1946. Sales of scrap and flake mica dropped to 86,309 tons, however—10 percent below the preceding year—and as a consequence total crude domestic mica sales decreased 9 percent in quantity from the peak year of 1955. Nevertheless, this amount was the second - highest annual figure on record.

Domestic fabricators consumed more than 3,800,000 lb. of muscovite block and film mica in 1956 (7 percent below 1955 consumption). Electronic applications accounted for 61 percent of the total used—virtually the same as in the prior year.

North Carolina, firmly established as the principal producing state, supplied about 87 percent of the total domestic output of sheet mica. Other leading producing states, according to the Bureau of Mines report, are New Hampshire, Georgia, Maine, South Dakota, New Mexico, South Carolina, and Alabama.

Barite A new record in domestic production of this commodity was set in 1956, according to reports compiled by the Bureau of Mines. The 1,351,913-ton total was 22 percent greater than in 1955. Consumption also established an all-time high of 2,062,076 tons, 90 percent of which was used in the production of ground barite.

The well drilling industry was again the largest customer for the ground and crushed barite sold by U. S. producers, and accounted for 95 percent of the total, Glass, rubber, and paint were, in that order, the other leading consumers.

Arkansas and Missouri retained their leaderships among producing states, and supplied 37 and 29 percent, respectively, of the domestic sales. Nevada, South Carolina, and Tennessee were also among the main producers.

Boron Boron minerals sold or used by U. S. producers in 1956 registered a 2 percent gain in 1956. According to the latest Bureau of Mines report on this commodity, this is the highest point since 1952. Of that tonnage, the B_2O_3 content was 315,047 tons.

Three companies reported production of boron minerals in 1956. Two processed brine from Searles Lake, Trona, Calif. They were the American Potash & Chemical Corporation and the West End Chemical Division of Stauffer Chemical Company. The Pacific Coast Borax Division of U. S. Borax & Chemical Corporation mined borax and kernite near Boron, Calif., colemanite at Death Valley Junction, and ulexite near Shoshone.

A highlight of the year's expansion in productive capacity was the conversion by the latter company of its underground operations to an open-pit mine and the construction of a new concentrator-refinery. (See PIT AND QUARRY, April 1957, p. 104.)

Clays While the latest data on these commodities available at the time of last year's survey covered only 1954, the 1955 and 1956 statistics are now at hand for this review.

In both years, most of the large uses of clay materials showed successive increases. The lightweight aggregate industry registered a 100 percent gain in 1955 over the preceding year, and increased the gain by another 34 percent in 1956 in arriving at a figure of 4,143,526 tons. Refractories, at 6,868,344 tons, had an increase of 9 percent over 1955, which in turn had a 34 percent gain over 1954.

Rotary drilling mud, which dropped 21 percent in 1954, had largely recouped by the end of 1956 through 8 and 10 percent gains in the earlier two years. Use in 1956 amounted to over 750,000 tons. Cement, which had also shown a decrease in 1954, came back strong, and by the end of 1956 had reached nearly 9,300,000 tons, or 21 percent of total clay use. Paper and rubber offset nominal decrease in 1954 by successive gains in the next two years.

Domestic kaolin sold or used by producers set new tonnage records during both 1955 and 1956. In the latter year, the new all-time high of nearly 2,250,000 tons was attained. As in previous years, paper, refractory, and rubber industries were leading consumers and accounted for 78 percent of the total consumption during 1956.

Fire clay tonnage sold or used by producers in the United States, after dropping to 8,800,000 tons in 1954, rose by 23 and 9 percent, respectively, in 1955 and 1956, in arriving at 11,800,000 tons during the latter year—the highest point since 1952. The higher level of activity in the refractory and construction industries that existed in 1955 and carried over in 1956 was a prime factor in the above gain. Refractories alone accounted, at 6,121,633 tons, for 52 percent of fire clay use and for 12 percent of all clay consumption.

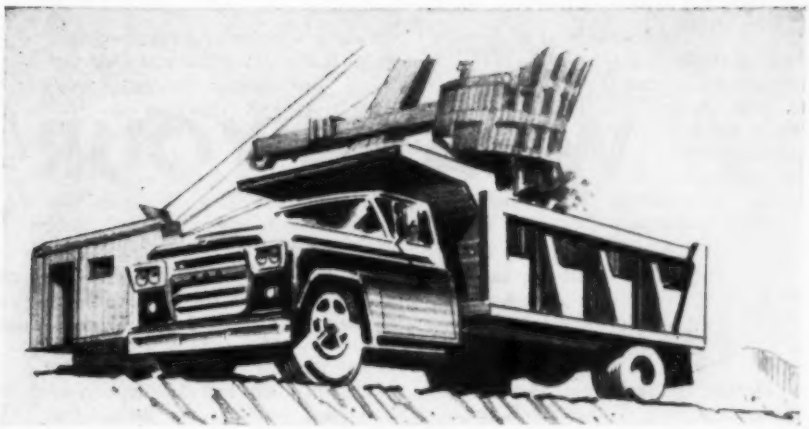
In both 1955 and 1956 bentonite producers set records, the 1,570,610-ton output of 1956 being a new all-time high. This was an increase of 6 percent over the preceding year. The petroleum and foundry industries continued as the large customers, consuming 83 percent of the total tonnage. The breakdown was as follows: rotary drilling mud, 40 percent; foundry sand bond, 26 percent, filtering and clarifying, 17 percent. Compared with 1955, rotary drilling mud gained 5 percent, while filtering and decolorizing, and foundry sand bond decreased 15 and 3 percent, respectively.

Domestic ball clay production reported to the Bureau of Mines for 1956 amounted to 458,806 tons—an increase of 12 percent, compared with 1955 and a gain of 40 percent over 1954. This commodity has shown successive increases during each of the five years 1952-56. Refractory use of ball clay increased 62 percent (including saggers, pins, and stilts) over 1955.

Talc According to reports of producers to the Bureau of Mines, the combined production and sales of talc, soapstone, and pyrophyllite in 1956 again set new highs for the industry. The tonnage produced (739,039), and sold (734,798), were each 2 percent higher than the records established during 1955. It was reported that talc and soapstone production increased 1 percent, and pyrophyllite tonnage gained 6 percent.

Ceramics, paints, insecticides, roofing, rubber, asphalt filler, and paper accounted for 88 percent of the talc and soapstone sold by producers during 1956. With respect to pyrophyllite, 90 percent of sales and use was in ceramics, asphalt filler, refractories, and paints. The quantity used for asphalt filler increased 85 percent, while the other categories decreased by varying percentages.

In the Stone Products Industry—



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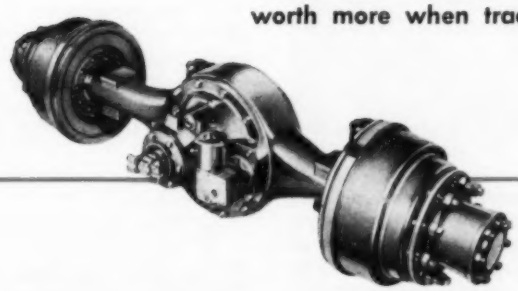
More than Two Million Eaton Axles in Trucks Today. For complete information, see your truck dealer.



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Enter 135 on card, page 167

WHAT'S YOUR Tax I. Q.?

Test your knowledge of the Federal Income Tax Law on this quiz, prepared by the American Institute of Certified Public Accountants in co-operation with the Internal Revenue Service. You will find the correct answers on page 147.

1. During the last year you spent approximately $1,000 for built-in bookcases and wall-to-wall carpeting for your office. Since your lease has only four years to run, you may . . .
   (a) Deduct the $1,000 on your 1957 tax return
   (b) Amortize the cost over the next four years
   (c) Depreciate it over the life of the furnishings

2. When you were transferred to another city, your company gave you a sum of money toward the cost of moving your family. For tax purposes, you should consider this money as . . .
   (a) A gift that is not taxable
   (b) Income that is subject to tax, with a deduction for only your personal moving expenses.
   (c) Income that is subject to tax, with a deduction for the cost of moving your entire family

3. You have invested in several blue-chip stocks. The dividends received from this investment are exempt up to . . .
   (a) $50 whether you or your wife owns the stock
   (b) $100 if the stock is held jointly by you and your wife
   (c) $100 regardless of who owns the stock, provided that you file a joint return with your wife

4. You are *not* permitted to deduct as contributions your donations to which of the following organizations or groups. . .
   (a) Charitable societies
   (b) Educational institutions
   (c) Political parties

5. Your daughter, who was hospitalized for several weeks in the earlier part of 1957, was married in November. If she files a joint return with her husband, you may . . .
   (a) Not claim her as a dependent but you may deduct her medical expenses
   (b) Claim her as a dependent and deduct her medical expenses
   (c) Not claim her as a dependent and you may not deduct her medical expenses

6. You filled very few inside straights during the last few months and lost approximately $300 to the members of your Thursday night poker club. You should . . .
   (a) Deduct the loss in computing adjusted gross income
   (b) Subtract the loss from adjusted gross income
   (c) Give up poker and start watching television on Thursday nights

7. Last October your car skidded on a wet road and grazed a telephone pole. The damage was not covered by insurance and it cost you $100 to have the car repaired. To claim a casualty deduction . . .
   (a) You must have the damage repaired within 30 days of the accident
   (b) You may simply deduct the amount of the repair bill
   (c) You must prove that you were using the car in your work at the time of the accident

8. Which of the following may you *not* consider a deductible expense . . .
   (a) A subscription to (insert the name of your trade publication)
   (b) Commutation fees
   (c) The costs of attending the (insert the name of a trade) convention

9. While playing hide-and-seek in your back yard, the neighbor's children trampled and killed several of your more expensive bushes. The cost of replacing this shrubbery . . .
   (a) May be deducted if it does not exceed the original cost of the bushes
   (b) May be deducted only if the parents of the children refuse to pay damages
   (c) May not be deducted under any circumstances

10. Your 16-year-old son works during the summer for you in your unincorporated business, and you pay him a weekly salary. Since he is a full-time employee, he is . . .
   (a) Required to pay social security
   (b) Not subject to social security
   (c) Permitted to decide whether he does or does not want social security coverage

11. Last year you gave your church a small piece of property for which you had paid $500 some time ago. Its value at the time of the gift was $1,500. As a result . . .
   (a) You may claim a tax deduction of $1,500
   (b) You must pay a capital gains tax on the $1,000 increase
   (c) You may claim a tax deduction of $500

12. There were a few leaks in the shingle roof of your office building; so you constructed a new tile roof. You should . . .
   (a) Consider this as a repair bill and deduct the entire amount as a business expense on your 1957 return
   (b) Regard this as a capital improvement and depreciate the cost over a period of years
   (c) Add the cost of the repair to the value of the property

13. After you have filed your personal 1957 tax return, the government is allowed to check your return and bill you for additional tax. The period of time in which this may be done ends . . .
   (a) On the day you file your 1958 return
   (b) Two years after you file your 1957 return
   (c) Three years from the date of your 1957 return

14. On the advice of a friend, you engage a certified public accountant to prepare your 1957 tax return. The fee he charges for this service is . . .
   (a) Not deductible since it is a personal expense
   (b) Not deductible if you are entitled to a refund
   (c) Deductible in full

(*Continued on page* 147)

Washington News

(*From page* 12)

Of the approximately 28 billion dollars of non-defense spending, the largest item, almost 8 billion dollars, is interest on the federal debt. Much of this is payable, of course, on bonds issued to finance World War II. Handling of an additional $1,500,000,000 spent for international affairs may be more important for maintaining the peace of the world than even the maintenance of large armed forces.

The next-largest item is almost 5 billion dollars spent for veterans' benefits. This item is also clearly a defense-related expenditure, even if related primarily to previous defense. The item of 5 billion dollars for agriculture may provide an opportunity for reduced expenditures, but only at the peril of many congressmen's political futures. It is not only unlikely but absolutely inconceivable that they will risk those futures for a few billion tax dollars.

This leaves such items as the $3,000,000,000 allocated for labor and welfare as the most likely source for cutting back the "swollen level" of non-defense spending. But this is the place where spending is likely to increase, particularly since the Department of Health, Education, and Welfare is the point at which improvement in the basic educational system must originate. It is also the agency which will be depended upon to administer any government moneys which go into improved education. There is very little risk in predicting that this budget will rise.

It will, no doubt, be argued that education is primarily a function which should be operated by the states; as a matter of principle, this is exactly the way it will be done. However, there is increasing recognition of a distinction between the administration of education and its financing. Not even the states are willing to preserve their right to the extent of turning down federal moneys, particularly if they can be received on the state's terms. The problem of the next Congress will be to work out a formula for federal contributions to education which will be acceptable to the states or, if not totally acceptable, so irresistible that they will not be able to forego it.

The Question of Succession

The other subject which is not only "grabbing the headlines" but is also giving some people here in Washington sleepless nights is the question of who can and who should take over in the event of the President's illness. To be sure, the recent illness was truly of minor seriousness; but the utter confusion which it generated was very significant.

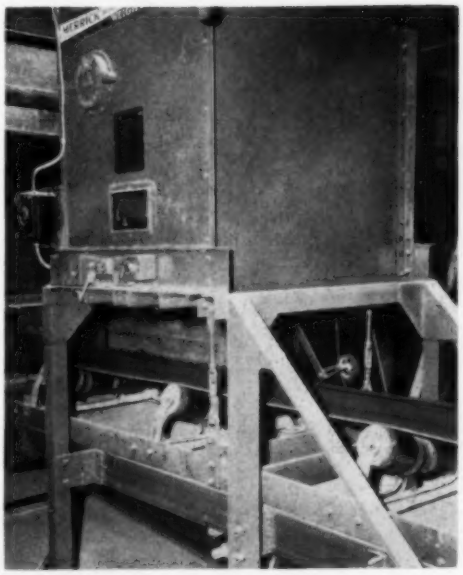
It was not until Robert Hagerty, the President's press secretary, returned hurriedly from Paris that some order was brought out of the confusion. This incident has raised some questions about the much-maligned Sherman Adams and his supposed power. The importance of Hagerty has probably been underestimated. The recent incident has revealed not only his known competence but also, to some extent, his truly policy-making role.

When Congress reconvenes, its work will be fully cut out. The matters with which it will have to deal, in the order of priority in terms of the nation's welfare, are probably these: (1) defense, including missiles; (2) education; (3) presidential succession; (4) appropriations; and (5) labor relations.

F. L. Sattes, 57, president of St. Albans Sand Company, Saint Albans, W. Va., died of a heart ailment in Charleston, W. Va.

MERRICK SCALES

Star Performers in '58
for weighing bulk material



American Nepheline Ltd., of Nephton, Ontario, pioneer producers of "Lakefield" nepheline syenite, constructed a new modern plant in 1956. This project is fully mechanized, and every operation is carefully controlled. Two MERRICK Weightometers* (one shown at left) record tonnages of finished glass and pottery grade materials passing from storage silos to the bagging department or bulk loading.

*Reg. U.S. Pat. Office

Thousands of MERRICK installations around the world attest the superior operating efficiency of these famous conveyor scales. They not only insure accurate weight data, but operate efficiently with low cost maintenance and provide long range service.

MERRICK Weightometers have long been selected by leading producers for providing reliable weight records of material in transit. Applicable to any width belt.

MERRICK Feedoweights automatically feed, blend and proportion by weight granular bulk materials: such as, gypsum, clinker, stone, ore, coal, etc. and as a result of their great accuracy insure high product uniformity.

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Enter 137 on card, page 167

New Dipper Dredge Doubles Output Of River Sand and Gravel

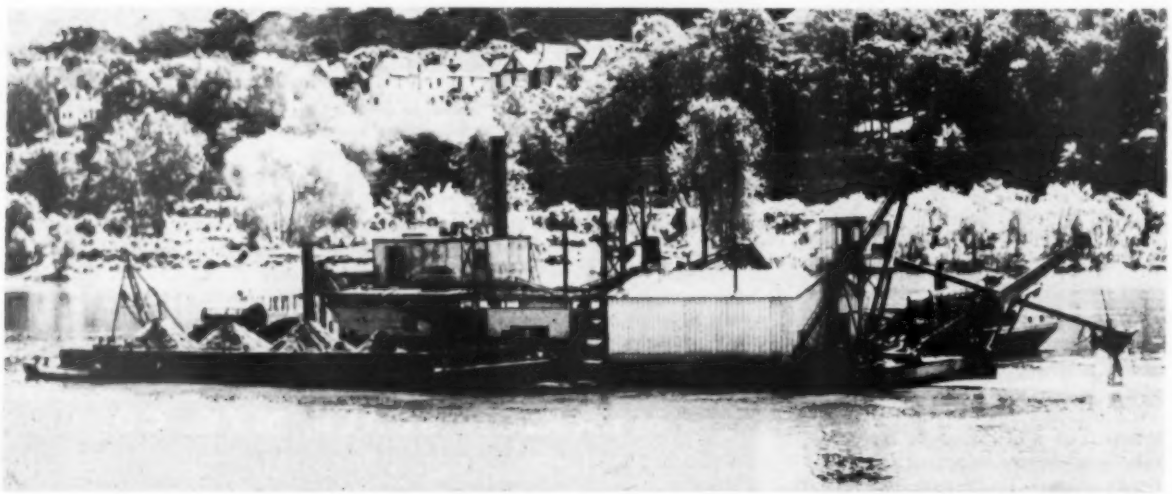
Oil City Sand & Gravel Company raises 850 t.p.d. from river bottom with 1½-cu. yd. dredge

WHEN a sand-and-gravel company whose main supply of material depends upon river dredging equipment must step up production, it is time to do one of two things. The management of the Oil City (Pa.) Sand and Gravel Company, which has been dredging, processing, and marketing coarse and fine aggregates from glacial deposits in the upper Allegheny Mountains for many years, had two choices—it could either purchase new and possibly costly equipment, or improve upon its existing equipment. It did both.

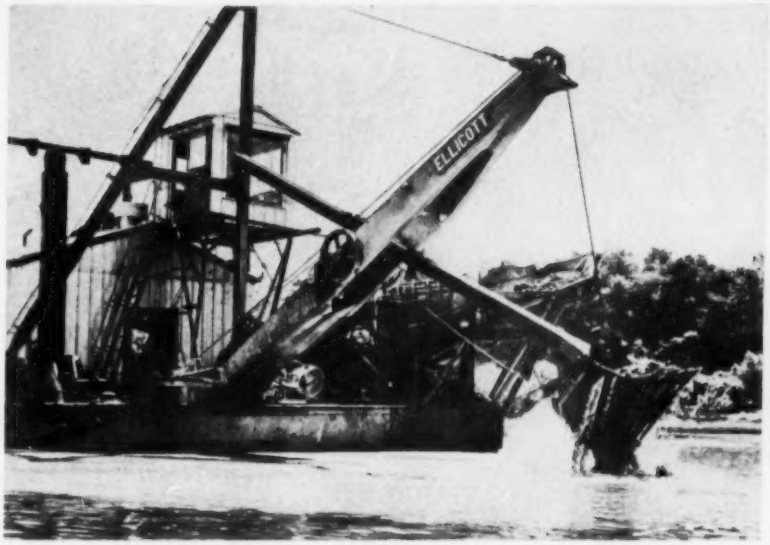
In dredging from the bottom of the Allegheny River at the plant site, the crew was having serious troubles with the old bucket ladder dredge, and these difficulties made dredging operations uneconomical. In the first place, the bucket could not handle large rocks and therefore had to be moved around considerably to bypass these rocks. Second, it could work no more than 20 ft. (and then only under excellent conditions) below the water. Because of the rocks, Oil City Sand & Gravel Company had to pass over large areas of usable materials and lose an unnecessary amount of time in moving the dredge from one working position to another.

The Ellicott Machine Corporation officials, after studying the situation

A shore view of Oil City Sand & Gravel Company's new dipper dredge shows the 1½-cu. yd. dipper bucket in operation on the Allegheny River between Oil City and Franklin, Pa.



Right: Here the dipper bucket is shown breaking water with a load of river bottom deposit. The dredge can work 23 ft. below the surface of the water. The dipper stick is 36½ ft. long overall.



Below: A 30-in. belt conveyor (foreground) takes the dredged materials from the grizzly to the jaw crusher, after which they are washed, screened, and dehydrated before being conveyed into a sand barge at left (not shown) and a gravel barge (right).

carefully, offered a means of nearly doubling the company's sand and gravel production by building a new dredge on the existing hull.

The result of this suggestion is a 1½-cu. yd. dipper dredge, a rare arrangement for river barge work, which makes use of Oil City's 35- by 130- by 5-ft. hull. Equipped with the latest electrical power and controls, the new unit has run production up to 850 tons in an 8-hour day; it has also greatly reduced the amount of time spent in re-positioning and has cut the necessary labor force from six men to four.

The new dredge is made up of four basic units: (1) a complete front assembly for a diesel-electric-powered dipper, (2) hoisting equipment, (3) an electrical d.-c. generator, and (4) a control system for operating the front assembly and another for operating the pin-up or spud equipment.

Certain other items, such as the screening and washing plant, were salvaged from the old dredge and incorporated into the Ellicott installation.

With the new dredge, it is possible to dig to a depth of 23 ft. Large rocks, which comprise a considerable proportion of river-bed material in this area, now present no problem. They are lifted in the dipper, or shovel, and discarded into the river at another point.

Whereas the old dredge lost much of an available deposit, the present equipment will work away efficiently at the same river-bed formation until it is essentially depleted. The former dredge required 15 moves to accomplish the same amount of work that the dipper dredge can do in one. This dipper can make a pass every 70 seconds, even in exceptionally hard digging. Its heavy weight gives a crowding action which forces it firmly into the formation to be raised.

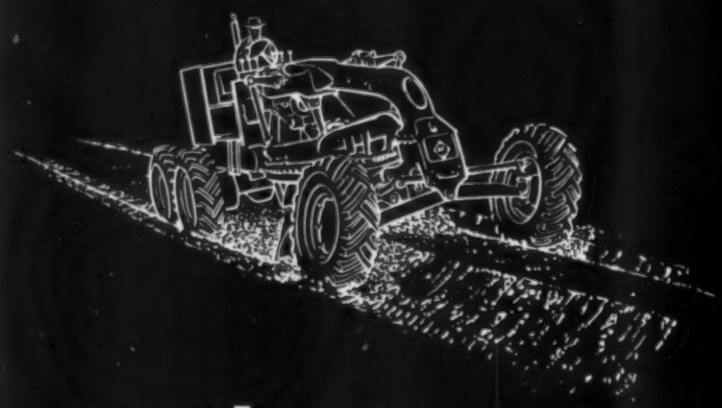
Materials are now processed on the spot as follows: The dipper dredge drops 1½-cu. yd. bites into a dump pan. The load then flows through a grizzly, where larger stones are separated and dropped back into the river. Rocks smaller than 8 in. are carried on a 30-in. conveyor belt laid at a 12-degree angle, which is believed to be ideal for the 4- to 8-in. rounded material.

Whenever market demands warrant, material from 2 in. plus is conveyed from a Tyler three-deck screen to a 10- by 36-in. Telsmith jaw crusher. The product of this crusher is returned to the main screen, thus completing a closed circuit.

Finished gravel from the screen is conveyed to a gravel barge on a 24-in. flat belt, while virgin sand is carried to a sand drag by means of a flume. In the drag, the sand is dewatered and carried to a sand barge on 18-in. herringbone-type conveyor belts.

The dipper dredge is powered by Cummins diesel engines driving both an a.-c. and a d.-c. generator. One generator is a 50-kw. unit of 250

(*Continued on page* 146)



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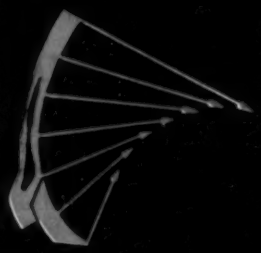

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Nebraska, N. Mexico, U. S. Possessions Report Higher Mineral Output in 1956

Nebraska

The value of all minerals produced in Nebraska in 1956 reached an all-time high of $69,137,000, compared with $54,552,000 in 1955 and $43,501,000 in 1954. The 27 percent increase in 1956, as well as the gain in 1955 over 1954, can be attributed almost wholly to the activities of the oil industry.

The remaining segments of the state's mineral industry in 1956 showed sporadic gains and decreases, but at the year's end the value of output of all nonmetallic minerals showed a small increase over 1955. These gains can be mainly attributed to the activity of the construction industry as related to residential and industrial construction and highway maintenance and construction.

New Mexico

The total value of New Mexico's mineral output (excluding uranium) reached a new record high of $480,823,000 in 1956. This 10 percent gain over the previous record established in 1955 resulted primarily from increased production of petroleum and, to a lesser degree, from advances in output of potash, copper, natural gas, natural-gas liquids, zinc, and sand and gravel.

With but a few exceptions minerals in the metal, nonmetal, and fuel groups showed gains both in quantity and value of output in 1955 and 1956. In 1954 this generalization was true of nonmetals and fuels, but in contrast metals as a group decreased. The figures for 1956 given in this release are preliminary, and those for 1954 and 1955 are final.

All of the state's fluorspar mines and mills remained idle throughout 1956 as a result of the depressed price for this commodity. Estimates of reserves of fluorspar, notwithstanding the Government Purchasing Program for metallurgical-grade fluorspar in the United States made by the Federal Geological Survey[2], indicates that New Mexico, Arizona, and Texas have measured and inferred reserves of 1,500,000 tons of fluorspar containing at least 35 percent CaF_2 or equivalent. This is 7 percent of the national total of 22,560,000 tons.

All New Mexico shipments of hand-cobbed mica in 1956 sent to the government's depot at Custer, S. D., continued at the same high rate reported in 1955.

[2]Office of Minerals Mobilization Geological Survey Press Release PN #7413, November 23, 1956.

Reappraisal of the government's mica buying program at Custer, S. D., resulted in an announcement of two new policies. First, the mica buying program was extended until June 30, 1962, and second, the prices paid to miners for mica brought to any of the three government purchasing depots have been increased.

Although the quantity of crude perlite mined in New Mexico dropped 17 percent in 1956, compared with 1955, the value of shipments only decreased 8 percent. This apparent contradiction can be explained by the rise in the average price of the crude material from $7.38 per ton in 1955 to $8.20 in 1956. Perlite producers whose main market is for lightweight aggregate material are faced with the complex problem of substitutes. With the diminishing market for its product as a lightweight aggregate, emphasis has been placed on securing a more stable market for a specialized product. With the adaptation of perlite in drilling for oil, the industry has been partially successful in achieving this goal. In addition, it is now able to sell its "fines" which heretofore had limited use.

Shipments of potash increased 4 percent over 1955 and rose to 1,906,000 tons (K_2O equivalent) valued at

MINERAL PRODUCTION IN NEBRASKA, 1954-56[1]

Mineral	1954[2] Short Tons (unless otherwise stated)	1954[2] Value	1955 Short Tons (unless otherwise stated)	1955 Value	1956[3] Short Tons (unless otherwise stated)	1956[3] Value
Clays	163,831	$ 163,831	150,835	$ 150,835	155,000	$ 160,000
Gem stones	.....	.....	[4]	2,400	[4]	3,000
Natural gas—million cubic feet	6,801	796,000	[3]12,515	[3]2,553,000	13,300	2,600,000
Petroleum (crude)—thousand 42-gallon barrels	7,783	21,400,000	[3]11,203	[3]30,810,000	15,634	43,000,000
Sand and gravel	8,547,876	6,992,314	8,405,197	6,192,797	8,900,000	7,120,000
Stone	2,660,170	3,511,494	3,396,464	4,492,578	3,500,000	4,900,000
Undistributed: Cement, LP gases, natural gasoline, and pumice and pumicite whose value must be concealed for particular years	.....	10,637,123	.....	11,143,474	.....	12,147,500
Total	.....	[5]42,393,000	.....	[5]54,552,000	.....	[5]69,137,000

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Production data presented for 1954 will be compared with the Bureau of Census data when they are available. Differences in figures will be adjusted or explained.
[3]Preliminary figures.
[4]Weight not recorded.
[5]State total has been adjusted to eliminate duplication of value in clays and stone.

$71,100,000, the highest in the state's history and second only to petroleum in terms of value. This new peak in sales compares with $64,367,000 in 1954 and $69,058,000 in 1955.

Output of pumice, pumicite, and scoria remained at relatively the same level as that reported in 1955, but the value of this mineral commodity as finally determined probably will increase over that reported in the previous year. The largest volume of tonnage sales went into the making of concrete aggregate and blocks.

Output of sand and gravel reported by commercial and government-contractor producers in New Mexico reached approximately 5 million tons, value at $6,600,000. The bulk of production resulted from the activity of the State Highway Department in its construction and maintenance program.

Limestone and stone classed as miscellaneous stone comprised nearly the entire state's production of this commodity. As in past years, almost all output resulted from contracts let by the State Highway Department for road building.

Puerto Rico

The total 1956 value of mineral production in Puerto Rico established a new record estimated at $15,200,000 compared with the previous 1955 record of $14,900,000, according to the Bartlesville, Oklahoma, office of the Bureau of Mines, U. S. Department of the Interior. Six minerals of the nonmetallic group were produced in Puerto Rico in 1956.

Cement in 1956 continued as the most important mineral commodity produced, comprising 83 percent of the total value. Shipments of portland cement increased as industrial construction continued active. Production was reported from Ponce and San Juan districts.

MINERAL PRODUCTION IN NEW MEXICO, 1954-56[1]

Mineral	1954[2] Short Tons unless otherwise stated)	1954[2] Value	1955 Short Tons unless otherwise stated)	1955 Value	1956[3] Short Tons unless otherwise stated)	1956[3] Value
Beryllium concentrate—gross weight	117	$ 43,771	105	$ 56,420	5	$ 2,500
Clays	47,832	83,085	45,351	108,582	46,000	110,000
Coal	123,099	727,372	[3]201,579	[3]1,236,125	155,000	[4]
Columbium-tantalum concentrate — pounds, gross weight	2,093	3,558	76	129	.....	.....
Copper (recoverable content of ores, etc.)	60,558	35,729,220	66,417	49,547,082	72,800	61,006,400
Ferruginous manganese ore (5 to 35 percent Mn)—gross weight	20,546	82,184	40,320	162,000	41,900	168,000
Fluorspar	8,876	[4]	[5]	[4]	.....	.....
Gem stones	[6]	[4]	[6]	25,000	[6]	28,000
Gold (recoverable content of ores, etc.)—troy ounces	3,539	123,865	1,917	67,095	3,460	121,100
Gypsum (crude)	887	2,661	.....	.....	.....	.....
Helium (shipments)—thousand cubic feet	41,755	735,183	53,721	946,447	75,257	1,338,936
Iron ore (usable)—long tons, gross weight	3,316	[4]	9,218	[4]	3,200	[4]
Lead (recoverable content of ores, etc.)	887	243,038	3,296	982,208	5,900	1,888,000
Manganese ore and concentrate (35 percent or more Mn)—gross weight	.....	.....	1,390	110,735	23,400	1,982,000
Mica:						
Hand-cobbed	[7]23	13,845	[7]115	64,930	115	67,930
Scrap	.....	.....	84	2,475	150	6,000
Natural gas—million cubic feet	449,346	35,049,000	[3]540,664	[3]48,119,000	592,500	52,500,000
Natural-gas liquids:						
Natural gasoline—thousand 42-gallon barrels	5,336	11,744,000	[3]12,843	[3]22,192,000	14,317	25,856,000
LP-gases—thousand 42-gallon barrels	5,381	5,704,000				
Perlite (crude)	111,040	885,824	147,805	1,091,250	122,000	1,000,000
Petroleum (crude)—thousand 42-gallon barrels	74,820	205,760,000	82,958	227,310,000	88,127	241,470,000
Potassium salts (K_2O equivalent)	1,732,240	64,366,641	1,826,118	69,057,754	1,906,000	71,100,000
Pumice and pumicite	363,926	1,060,096	393,597	780,339	400,000	817,000
Salt	50,669	333,255	49,738	596,780	50,000	598,000
Sand and gravel	6,519,339	8,340,251	4,556,447	6,004,554	5,000,000	6,600,000
Silver (recoverable content of ores, etc.)—troy ounces	109,132	98,770	251,072	227,233	397,000	359,305
Stone	771,630	714,037	1,576,125	1,549,111	1,800,000	2,000,000
Tungsten concentrate—60 percent WO_3 basis	[8]	1,414	1	3,036	1	2,830
Zinc (recoverable content of ores, etc.)	6	1,296	15,277	3,758,142	35,200	9,504,000
Undistributed: Barite, carbon dioxide (natural), diatomite, molybdenum, elemental sulphur, vanadium, and minerals whose value must be concealed for particular years (indicated in appropriate column by footnote reference 4)	.....	1,672,426	.....	1,733,332	.....	2,297,100
Total	.....	373,518,000	.....	435,731,000	.....	480,823,000

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers). Value of low-grade manganese ore shipped to General Services Administration Purchase Depots and uranium ore is excluded.

[2]Production data presented for 1954 will be compared with the Bureau of Census data when they are available. Differences in figures will be adjusted or explained.

[3]Preliminary figures.

[4]Value included with "Undistributed."

[5]Bureau of Mines not at liberty to publish.

[6]Weight not recorded.

[7]Sheet equivalent, 2054 lb. (1954), 9215 lb. (1955).

[8]Less than ½ ton.

Production of miscellaneous clay in 1956 increased slightly as demand for clay for use in the production of cement and heavy clay products remained high.

Sand and gravel production in 1956 surpassed the tonnage record set in 1955 as an estimated 425,000 tons were produced, valued at $692,000. Production was reported from all seven districts, and was used for building and paving and in the production of glass and ceramic products.

Production of stone in 1956 increased in quantity and value over 1955 as demand for crushed and dimension stone remained high. Stone was used mainly for building and paving purposes. Limestone also was used in the manufacture of cement and lime.

MINERAL PRODUCTION IN POSSESSIONS OF THE UNITED STATES, 1955-56[1]

Possession and mineral	1955 Short Tons (unless otherwise stated)	1955 Value	1956 (Preliminary) Short Tons (unless otherwise stated)	1956 (Preliminary) Value
Canal Zone:				
Sand and gravel	35,910	$ 47,229	37,000	$ 50,000
Stone (crushed)	169,485	239,280	174,600	251,000
Total Canal Zone		286,509		301,000
Puerto Rico:				
Cement, 376-lb. barrels	4,116,739	12,506,784	4,117,000	12,600,000
Lime (open market)	10,392	254,121	11,320	277,000
Salt	10,496	112,399	11,400	122,500
Sand and gravel	433,017	678,761	446,000	713,000
Stone	1,783,910	2,515,760	1,837,000	2,642,000
Undistributed: Other nonmetallic minerals		121,753		125,000
Total Puerto Rico		[2]14,917,000		[2]15,165,000
Virgin Islands:				
Stone (crushed)	875	4,900	800	4,800
Grand Total		[2]15,208,000		[2]15,470,000

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]The total has been adjusted to eliminate duplication in value of clay and stone.

Panama Canal Zone

Production of sand and gravel and stone in 1956 was estimated at 212,000 tons, valued at $301,000. Stone provided 83 percent of the output and value. The Panama Sand Company produced sand and gravel for building and paving purposes. 1956 production and value increased over 1955. The Panama Canal Company quarried and crushed basalt for concrete, road metal, and riprap purposes.

Virgin Islands

Stone production comprises the mineral industry of the Virgin Islands. 1956 production approximated that of 1955. Basalt was quarried and crushed on St. Croix Island by the Virgin Islands Corporation and used for concrete and road metal purposes.

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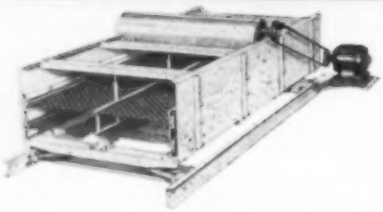

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E. C. Wenger Leaves Post On P.C.A. Conservation Bureau

E. C. Wenger, manager of the conservation bureau of the Portland Cement Association since 1947, retired from his post on December 1, 1957. He plans to practice as a consulting engineer in the highway and municipal improvement field.

Mr. Wenger has been a member of the P. C. A. staff since 1934. For 13 years he was regional highway engineer in the association's Midwest region.

American Aggregates Stars In How-We-Do-It Film

In a small town Ohio setting, a one-reeler filmed recently featured an unusual hero, American Aggregates Corporation, one of the world's largest sand and gravel producers. The movie was made to depict the efforts which have been made by this firm for more than 25 years to restore beauty and/or usefulness to worked-out land.

According to the director of Cinecraft Productions, the motion picture producer, this is an educational film which shows how American Aggregates carries out rehabilitation plans in three states. Shots have been taken near Dayton, where an old quarry is being transformed into a reservoir for the city; another part shows an operation near Columbus, where a fishing lake has been created from a quarry area.

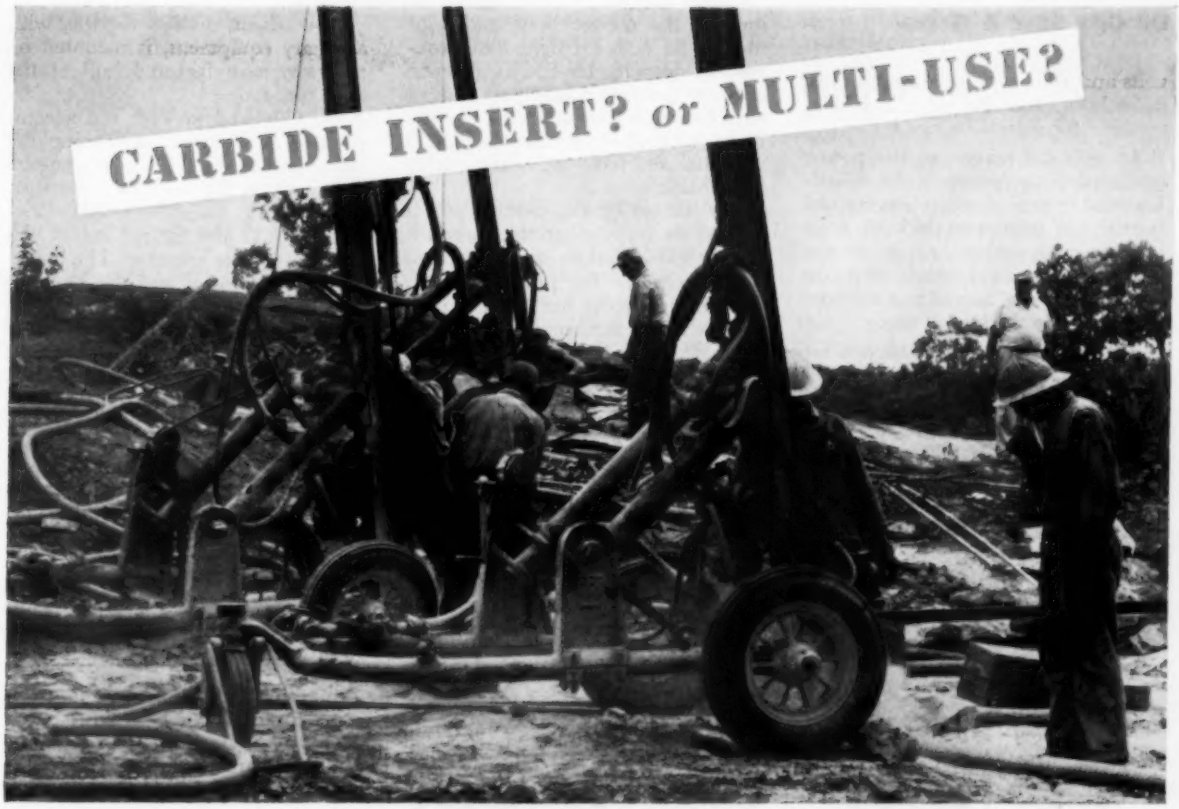
This film will be shown in communities whose support the company desires to enlist for its operations.

Lake View Sand and Gravel Wins Motor Safety Award

The Lake View Sand and Gravel Company, Fond du Lac, Wis., was awarded the Trailmobile award by the Wisconsin Motor Carriers Association for having the best local trucking safety record under 1,000,000 miles in the state in 1956.

The association learned of Lake View's outstanding record from reports filed with the Wisconsin motor safety program. The award was presented at the association's recent convention at Delavan. Lake View has 20 drivers who share the honor.

As the nation's second-largest producer of sand and gravel, Michigan supplied a total of 42,000,000 tons valued at $37,000,000 in 1956. Conservation Department records indicate a 3,000,000-ton increase in production per year since 1951.



Westchester Rock, Inc., reports faster drilling, fewer bit changes in granite gneiss with TIMKEN® carbide insert bits

THE new Cross Westchester Expressway cuts through hard, abrasive granite gneiss. Drilling depths often reach 30 feet. Yet good speed and minimum bit changes are reported by Westchester Rock, Inc., of White Plains, N.Y. They're holding cost per foot-of-hole down with Timken® carbide insert bits.

You'll make good time in tough rock with these bits, too. But carbide insert bits may not be your best bet for every job. In ordinary ground, where you can drill out full increments of steel and do proper and controlled bit reconditioning, you'll get your lowest cost per foot-of-hole with Timken multi-use bits.

Multi-use or carbide insert, Timken bits save time for your drillers because they are interchangeable in the same thread series. When drilling conditions change, you can change bits without the trouble of changing drill steels. And Timken bits last longer because their special shoulder union protects threads against drilling impacts.

To assure the quality of Timken bits, we make them from our own electric furnace, Timken fine alloy steel. No other American bit manufacturer takes this extra quality control step. Let us recommend the right bit for your next job. Just call or write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, O. Cable: "TIMROSCO".

Timken threaded multi-use rock bit

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Enter 145 on card, page 167

Oil City Sand & Gravel

(*From page 139*)

volts and 200 amps for operating the main hoist, and the other a 10-kw. unit for the lateral swings.

An efficient feature of the power and control equipment is the Ward-Leonard system of excitation control for the d.-c. motors on the main hoist and swinger. Also unique is the Westinghouse air control valve on the crowd brake, as well as a solenoid air control on the bucket trip.

The dipper dredge is designed for one-man control. The operator manipulates the dredge hoist and trips the bucket with his right hand control, swings with his left hand lever, operates the crowd brake air control with his right foot and operates the drum controller on the back haul with his left foot—all while sitting in a chair.

For the pin-up equipment there is a separate set of controls, inasmuch as pin-up operations are performed less frequently. The pin-up not only steadies the dredge but shifts its position when a change of location is needed. Large moves are made with a tug.

The Ellicott dredge, together with auxiliary equipment, is mounted on a Dravo manufactured hull of the boot-jack type.

Oil City had to work out a complicated problem in converting the raked bow of the old hull to a square bow because dry dock facilities were not available. Barges were laid alongside the hull and the old ladder was placed atop the assembly. The barges were then flooded and the assembly was tied up with 2⅛-in. cable, and 50-ton steam boat ratchets were used to take out slack. Once the barges were pumped out, the end of the hull could be floated to permit making bow changes.

With the new equipment, company officials expect service to customers to be greatly expedited. River operations are carried out 8 to 10 hours every day 6 days a week. The company's plant at Oil City is operated about 9 months a year, depending upon river and weather conditions.

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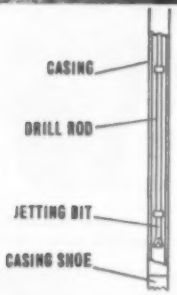

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Enter 146 on card, page 167

Mineral Resources of Maine Described in New Booklet

The Geological Survey Division of the Department of Economic Development (Maine) has announced the release of a booklet entitled *Information Relating to Mineral Exploration and Development on the Public Lands,* compiled and published by the Geological Survey for the Maine Mining Bureau.

The booklet outlines the public-land mining law enacted in 1957 by the 98th legislature, and describes the procedure for prospecting and locating mining claims on state-owned lands.

The law itself is also reproduced for the benefit of those specifically interested in prospecting state lands. The booklet is available from the State Geologist, Department of Economic Development, Augusta, Maine, for 35 cents a copy.

Inland Lime and Stone Company of Manistique, Mich., had shipped 3,685,655 tons of limestone in a total number of 372 vessel loadings by the end of October, 1957. This approximated the record for the same period in 1955 and was about a month ahead of 1956.

American Potash and Chemical Corporation, Los Angeles, Calif., has completed arrangements to explore manganese ore deposits located on 10,700 acres near Batesville, Ark. Mineral rights to the deposits are held by four Arkansas firms.

AT CONSUMER COMPANY'S QUARRY

What's Your Tax I. Q.

(Answers)

(*From page* 146)

1. (b) On leased property, you normally spread the cost of improvements over the shorter period—the life of the improvement or the term of the lease. Since your lease expires in four years, and presumably the furnishings will have a longer life than that, you should be able to claim a $250 deduction on your federal tax return for this year and the next three years.

2. (c) The money you received from the company must be reported as income, but you may deduct the cost of moving your entire family. If the amount the company gives you exceeds your expenses, the excess is taxable. Conversely, however, if your expenses were more than the amount received, the difference is *not* deductible.

3. (a) and (b) are both correct. All taxpayers are entitled to a $50 dividend exemption. A husband and wife can combine their exemptions and receive $100 in dividends tax free, providing that the stock is jointly owned. The filing of a joint return will not qualify them for this double exemption if the stock is held in only one of their names.

4. (c) You cannot deduct contributions to an organization which spends substantial part of its time lobbying or distributing political propaganda.

5. (a) You gained a son-in-law but lost a $600 dependency exemption for 1957 when your daughter married in November. All is not lost, however. If you provided more than one-half of your daughter's support during the year, you may claim her medical expenses as a deduction on your return.

6. (c) Watching television can be most relaxing and it might even help you to forget your poker losses—which is the thing to do because net gambling losses are definitely not deductible. Net gambling gains are taxable as income; so if you won money in a football pool or other sources, you may use your poker losses to offset these gains.

7. (b) The IRS has ruled that "if the repairs do nothing more than restore the property to its condition immediately before the casualty and do not add to (its) value, utility or useful life, such repair costs may be used as a measure of the value of the destroyed portion." Where you were going at the time of the accident does not affect the deductibility of car damages.

8. (b) Commutation fees are not a deductible business expense. The cost of going to and returning from work, whether it be by bus, cab, train or plane, is not deductible since it is a personal expense. On the other hand, (a) and (c) are deductible.

9. (c) Damage to your shrubbery caused by children, dogs, or errant lawnmowers is not deductible. If your home or lawn is damaged by fire, storm, or flood, the loss not covered by insurance may be deducted. When large amounts are involved, it is wise to have an expert appraisal made immediately after the casualty.

10. (b) Since your son works for *you,* you are not supposed to pay social security tax on his wages, nor is he required to make contributions. If your business is incorporated, however, the corporation must pay social security tax on his salary.

11. (a) Your deduction for a charitable contribution is the value of the gift at the time it is made. You are not considered to have realized a taxable gain or deductible loss when you give property away. You may claim a deduction for the entire $1,500, so long as this amount does not exceed 20 percent (30 percent in some cases) of your adjusted gross income.

12. (b) The roof is considered an improvement, not an ordinary repair. The cost of replacing the roof is deductible as depreciation spread over its estimated useful life.

13. (c) In the absence of fraud or substantial understatement of income, the government has three years from the due date of your 1957 return to check your return and bill you for additional tax. Since the due date of most individual returns is April 15 and since for investigation purposes all returns are treated as though filed on the due date, you should be sure to save all check stubs and receipted bills to prove your declared deductions until April 15, 1961.

14. (c) The fee which a certified public accountant charges you to prepare a tax return or defend the accuracy of your return before the Treasury Department is deductible in full if you itemize deductions.

Flintkote Company's multimillion-dollar gypsum products plant at Sweetwater, Tex., is now officially in production. The big installation is Flintkote's first gypsum venture, as well as its first plant in Texas.

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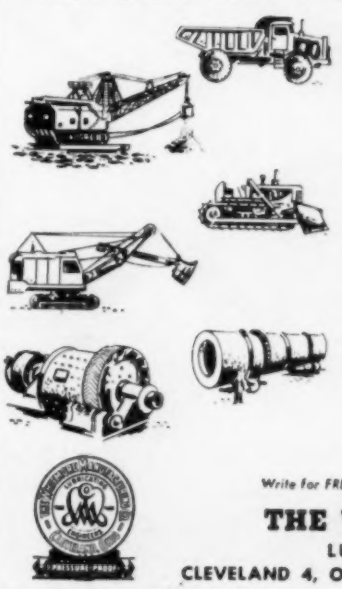

World-famous Whitmore Lubricants succeed where others fail. They are lubricants, not greases. Whitmore's exclusive never-duplicated formulas stop metal-to-metal contact—put wear on the lubricants instead of on costly gears, bearings, and cables. That's why manufacturers of earth, rock, coal, and ore moving and processing equipment recommend Whitmore Lubricants to give you the service they built into your equipment.

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Never-duplicated formulas that provide a hard finish impervious to moisture. Absolutely impossible for dust to cling to lubricated surfaces.

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Extremely high load carrying capacities for climatic conditions from the Tropics to the Arctic.

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Increases yardage life up to three times. Absolutely stops corrosion by penetrating to the cable core and eliminating internal friction.

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Enter 147 on card, page 167

AT CONSUMER COMPANY'S QUARRY

P&H ELECTRICS PROVE

In the 100-ft. deep mammoth Consumer Company limestone quarry in McCook, Illinois, this 5 cu. yd. P&H Electric Shovel is proving to be a vital link in the production of crushed stone. Biting into the 50 ft. face, this P&H Model 1500 loads a steady string of 5-ton trucks to keep crushers operating 'round-the-clock.

This maximum availability coupled with a minimum of maintenance is typical of P&H performance in important mines and quarries throughout the world. That's why leading operators are choosing P&H Electrics for both new installations and replacements.

Comparison tests have proved that two exclusive P&H features pay off in *continuous profitable production:*

MAGNETORQUE,® the electro-magnetic type coupling that transmits power from hoist motor to dipper for faster action, eliminating shock and impact to the hoist gear train and motor.

ELECTRONIC CONTROLS, the fastest acting type of control available on electric shovels, providing the smoothest, quickest production cycle known.

With P&H you get single source responsibility . . . another distinct advantage experienced only by users of P&H Electric Shovels. P&H designs, manufactures and applies all electric rotating equipment specifically for electric shovel service.

P&H DIESEL ELECTRIC: 4½ cu. yd. capacity
P&H ELECTRIC SHOVEL LINE: 3½ through 10 cu. yd. capacities

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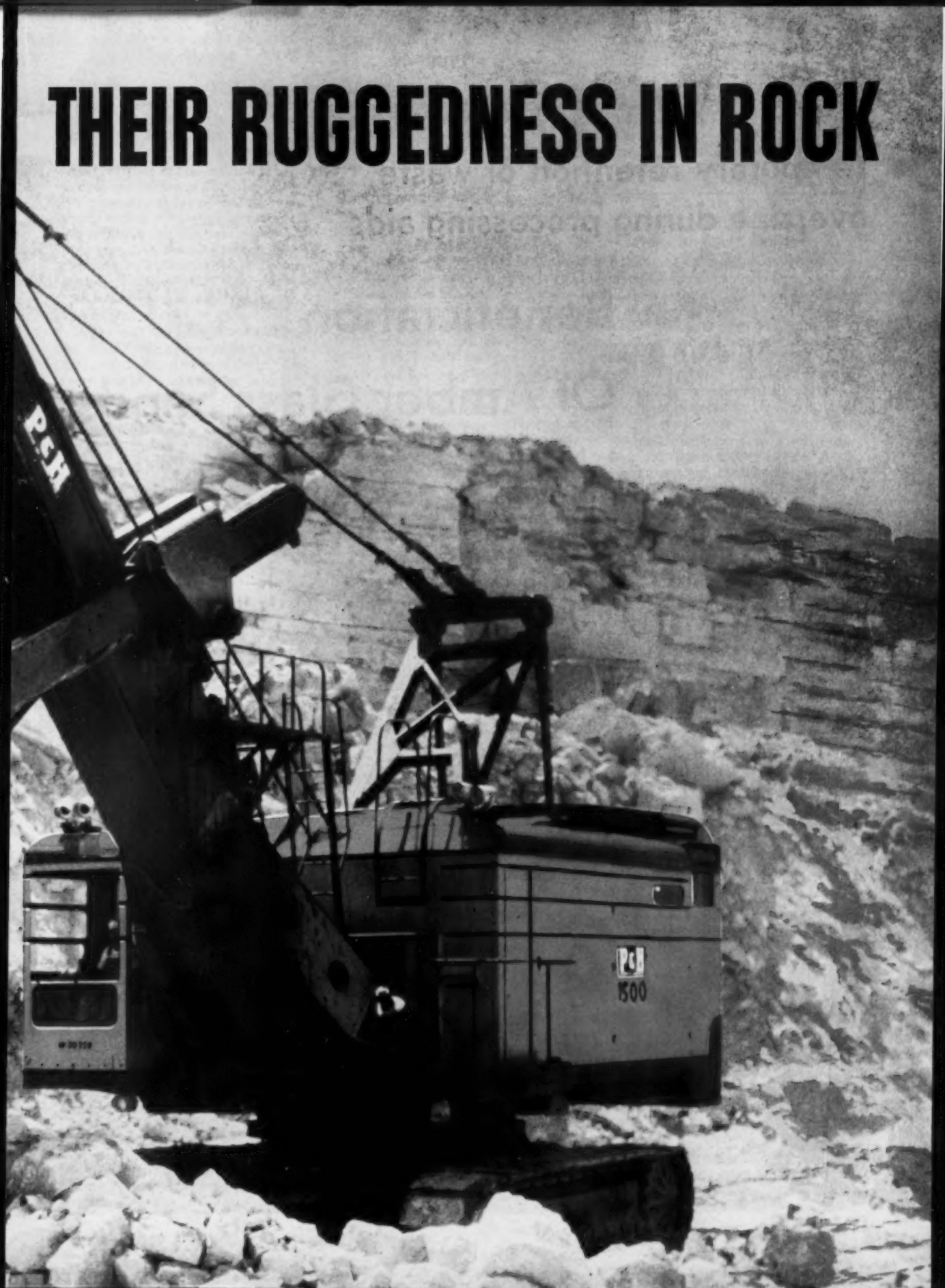
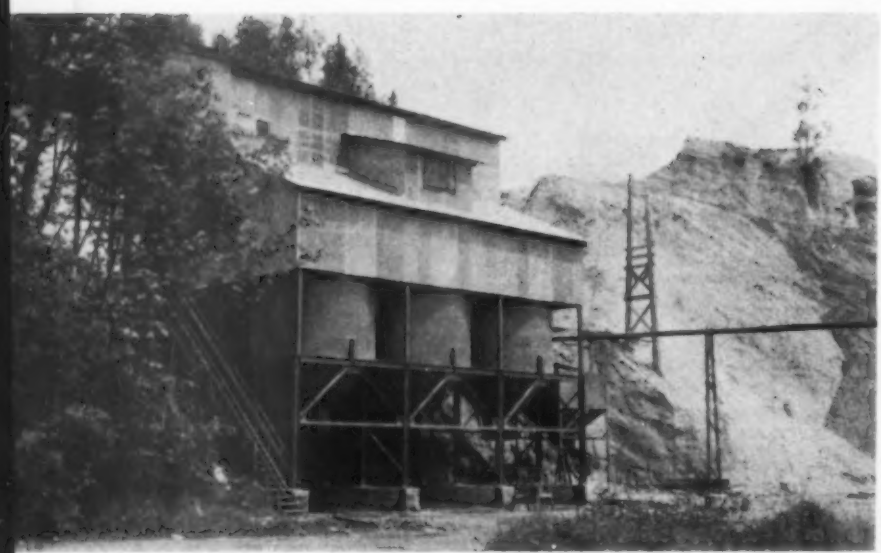
THEIR RUGGEDNESS IN ROCK



temporary retention of waste oversize during processing aids

Beneficiation Of Amber Glass Sands



New plant of Smith Bros. Silica Sand Co., east of Auburn, Wash. Finished material is held in the three 100-ton truck-loading bins. Part of the 77-acre deposit is in the background.

By HARRY F. UTLEY

ANOTHER ON THE SPOT REPORT

SAND destined primarily for use in the manufacture of amber container glass is processed in the new plant of Smith Brothers Silica Sand Company, which went into production in January, 1957. The new operation replaces an older, less efficient layout which had been in service since 1938 at the deposit, about ten miles east of Auburn, Wash. Output in the new plant is currently running at the rate of about 100 t.p.d. (8-hr.), nearly double the former capacity.

Finished product is in the minus 18-mesh range, but a considerable volume of oversize material is carried along through the various stages of scrubbing and attrition before it is finally rejected to waste by a pair of screens. Although this puts an extra burden on the processing equipment, the sharp coarse oversize has been found to be of great aid in scouring the wanted finer grains of their iron and clay coatings as they are carried through two wet scrubbers and two screw washers which precede the screens. The finished sand seldom contains in excess of the 0.20 percent Fe_2O_3 content specified by the company's exclusive glass-making purchaser, the Northwest Glass Company of Seattle. Any of the product with a higher iron content is binned separately and sold to the Layrite Products Company, which uses it as a sparkling fine aggregate in a decorative split block manufactured in its Seattle concrete products plant.

The 77-acre sandstone deposit occurs on a steep hillside immediately behind the new plant and, after considerable stripping, is worked selectively on 20-ft. benches. No blasting is required, however; the material is dug by shovels equipped with sharp tungsten-carbide bucket teeth which are able to break it up sufficiently for in-plant handling. Three ¾-cu. yd. machines, two Units and

a Lorain, excavate the banks and load to dump trucks which deliver to a 30-ton receiving hopper at an upper level at the plant.

From the hopper, a twin-screw feeder further breaks up the chunks and, aided by water introduced under pressure, delivers the raw material into a 6-ft. diameter revolving scrubber for the primary cleaning stage. At the discharge end of the drum, a cylindrical ¼ in. screen section removes trash, clay lumps, and stones, which are chuted away to waste.

After this preliminary scrubbing, the sand undergoes washing, abrading, and dewatering in a 20-in. Telsmith screw classifier, from which it is then discharged into another 6-ft. cylindrical scrubber for further attrition and scouring in clean water. Following the second scrubber, another 20-in. Telsmith screw washer is employed to separate the now relatively clean sand from the soluble clay, iron oxide, etc. The helix delivers over the upper end of the trough to a pair of 4- by 5-ft. Overstrom screens. These single-deck units are arranged in line forming, in effect, a 4- by 10-ft. stepped screening surface with four banks of washing sprays above. Here the plus 18-mesh grains are removed after having served their purpose as scouring media. Oversize is chuted to a truck-loading bin outside the plant structure. This material is sold for highway-maintenance work and for other uses in which a clean, sharp, fine gravel is desired.

Screen throughs are piped to a third and final 20-in. Telsmith screw washer for dewatering before the finished sand is binned for shipment. Three 100-ton cylindrical truck-loading bins arranged in line are filled selectively by an 18-in. by 21- ft. shuttle-belt conveyor.

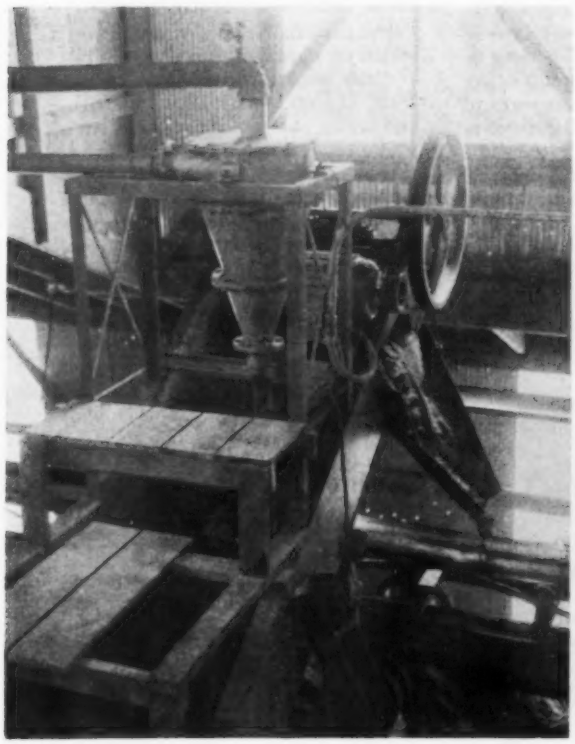
All overflow from the three screw washers in the plant is flumed to a sump box and from there pumped up to a 20-in. Duraclone rubber-lined liquid cyclone which extracts the good quartz fines, returning the recovered material to the upper end of the final screw washer. Here it is blended into the finished sand stream just before it is sent to the storage bins. Cyclone-recovered product amounts to about 5 percent of the total volume of finished sand.

All shipments to Seattle, a one-way haul of about 80 miles, are made by a fleet of four company trucks, each of which carries a payload of 12 tons.

Water required in processing is pumped to the plant from the Green River nearby at about 700 g.p.m. *via* a 6-in. pipeline.

The owners—Fred, Charles, and Henry Smith— designed the new plant, and it was erected under their supervision.

Overflow from three screw washers is handled by this 20-in liquid cyclone. It extracts clean fines from the waste and discharges them into the classifier trough for blending into the finished product.



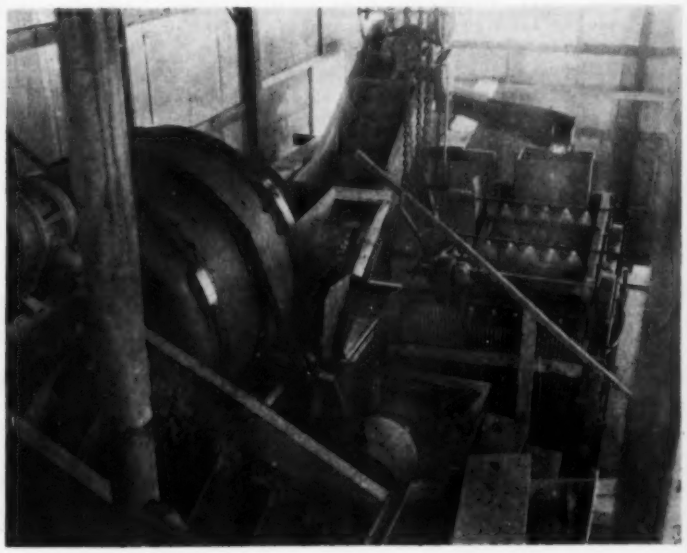
Conveyor Belt Speed-Up Shortens Roadbed Project

A new world's speed record for material handling has been set at Little Valley, Utah, where the Morrison-Knudson Company is moving 30,000,000 tons of gravel to build a 13-mile roadbed across Great Salt Lake for the Southern Pacific Railroad. The prime contractor is using a 2-mile conveyor system designed and manufactured by Hewitt-Robins, Inc., to do the job.

Although the conveyor system was designed to move the material at an average rate of 75,000 tons per day, it actually averaged 83,333 t.p.d. during a recent 30-day period, or a total of 2,500,000 tons. Conveyor belts run at the rate of 850 f.p.m.—or approximately twice the usual belt speed. Main line belts carry surge loads as high as 5,000 t.p.h., more than 1,000 tons above their designed capacity.

The new Point Stone Company, Batesville, Ind., has purchased the Napoleon Stone Quarry, Inc., Napoleon, Ind. Plans of the new owners include expansion of crushed stone production at the 30-year-old quarry.

Shown here are two of the three screw washers, one of the scrubbers, and the 4- by 10-ft. spray-equipped vibrating screen which removes plus 18-mesh oversize after it has served its purpose as a scouring aid.



Winning Sand-Gravel Plants Cited In Bureau of Mines Safety Contest

AWARDS for outstanding safety records in 1956 were made by the Bureau of Mines, United States Department of the Interior, to 54 of the 154 plants competing in the National Sand and Gravel Safety Competition. These 54 operations were awarded Certificates of Achievement in Safety for having operated 20,000 or more injury-free man-hours during the year. The participating plants competed in two groups, according to type of operation—bank or pit, and dredge. Twenty-seven of the enrolled plants were dredge operations and 127 worked banks or pits.

The overall injury experience for the 1956 competition showed a frequency rate of 20.7 injuries per 1,000,000 man-hours and a severity rate of 3.8 days lost per 1,000 man-hours of work. Man-hours worked by competing operations totaled 9,600,000. Certificates of Achievement in Safety were awarded to 54 plants that operated 20,000 or more man-hours during the year, and each employee of the top-ranking plant of each group was presented a Certificate of Accomplishment in Safety.

For the second consecutive year, the Lockport plant of the Material Service Corporation at Lockport, Ill., won top honors for the best safety record in the bank or pit group. In 1956 this plant was operated 220,728 man-hours without a disabling lost-time injury. During the three years that the Lockport plant has participated in the National Sand and Gravel Safety Competition, it has recorded only 6 days of lost time, charged to one temporary total injury during a total worktime of 564,279 man-hours.

The 127 bank or pit operations entered in the 1956 contest were operated more than 7 million man-hours. Their injury-frequency rate was 20.763 injuries per 1,000,000 man-hours—the 7-year low for this group. The severity rate of 2.469 days lost per 1,000 man-hours of exposure to work hazards showed a 53 percent increase over this group's rate of 1.159 during the 1955 competition. This increased severity rate was accounted for by the proportionately increased number of days lost from disabling work injuries. These lost-time days were 55 percent higher than in 1955. The 1956 figures indicate 147 injuries, including 1 fatal, 7 permanent partial, and 139 temporary total.

The Flint Sand and Gravel plant of Jahncke Service, Inc., at Bluff Creek, La., had the best safety record among the 27 dredge operations enrolled in the 1956 competition. A Certificate of Achievement in Safety was awarded to this plant for an injury-free record during 126,108 man-hours of work. This is the second successive year that the Flint Sand and Gravel plant has won the coveted Certificate for being the top-ranking operation; its 1955 record was 116,413 injury-free man-hours. In 1954 it won honorable mention for operating 123,135 man-hours with no injuries. This plant has been a steady participant since the beginning of the contest in 1950. During the 7 years it has been operated 794,591 man-hours with only 9 temporary injuries.

The 27 dredge operations participating in the 1956 National Sand and Gravel Safety Competition worked 2,567,077 man-hours with 53 injuries that caused 19,326 days of charged disability. The group's safety record showed frequency rate of 20.646 injuries per 1,000,000 man-hours. 15.7 percent lower than the group's 1955 rate of 24.485 and .89 percent lower than its 7-year rate of 20.831.

In all, 74 competing sand and gravel plants operated throughout 1956 without a lost-time disabling injury. Men at these plants, of which two were winners, worked 2,880,649 man-hours or 30 percent of the combined worktime of all enrolled plants. Of the 74 injury-free plants, 64 were bank or pit operations and 10 were operated as dredges. Included in the 74 were 18 bank or pit and 2 dredge operations that worked less than 20,000 man-hours, the minimum required by the competition rules for consideration of the awards of certificates.

The safety record of the 154 participants of the 1956 contest was a total of 200 disabling injuries in an aggregate worktime of 9,646,969 man-hours, resulting in a frequency rate of 20.732 injuries per 1,000,000 man-hours of exposure to work hazards. This was the lowest frequency rate attained in the 7 years of the Bureau's safety competition for sand and gravel plants, being 8.5 percent lower than the 1955 rate of 22.668 and 11 percent lower than the overall frequency of 23.290 for the 7-year period. Days lost by these 154 participants totaled 36,808, resulting in a severity rate of 3.815; this, unlike the frequency rate, was the highest in the history of the contest. It was 26 percent higher than the 1955 rate of 3.019 and 36 percent higher than the 7-year overall rate of 2.808.

Of the 200 injuries recorded at the sand and gravel operations in 1956, 4 resulted in death, 8 caused permanent partial disabilities, and 188 were of temporary total nature. The average severity for the temporary total injuries was 23 days, and for all injuries, 184. This all-injuries average did not compare favorably with the similar average for any other year, the next highest, 155, having been experienced in 1953.

The principal causes of injuries reported by sand and gravel operations in 1956 were falls of persons, handling objects, machinery, haulage, and falling objects. These five causes accounted for 118 injuries, or 62 percent of all those with stated causes at the participating plants. The most severe injuries at these operations occurred from machinery, haulage, drowning, and falls of persons, in this order, causing 28,714 days of all disability or 93.5 percent of all days lost from injuries with stated causes.

At bank or pit operations, accidents from falls of persons accounted for 16.7 percent of all injuries with stated causes; handling objects, 13.3 percent; machinery, 11.9 percent; haulage and falling objects, 9.8 percent each. Ninety-four percent of all stated causes were recorded under these five classifications. The most severe injuries involved machinery, falls of persons, falling objects, and hand tools.

Injuries from falls of persons, handling objects, machinery, haulage, and falling objects were the highest at dredge workings; however, the

most serious, including two fatalities, were from haulage and drowning. This group of the competition had a third fatal injury, but the participating company did not report the cause of death.

All bank, pit, or dredge plants operating unconsolidated sand and/or gravel deposits in the continental United States are eligible to enter this Safety Competition, which is sponsored and conducted annually by the Bureau of Mines, United States Department of the Interior.

In each group, the plants are ranked in order of the injury-severity rates. Where there have been no disabling lost-time injuries, they are ranked in order of man-hours worked. The winner in each group is awarded a Certificate of Achievement in Safety, and each employee at the winning plant receives a Certificate of Accomplishment in Safety. A Certificate of Achievement in Safety also is awarded to each injury-free operation that was operated 20,000 or more man-hours during the year. All Certificates are Bureau of Mines awards.

Enrollment applications, rules, and information on the competition are available, on request, from the Branch of Accident Analysis, Division of Safety, Bureau of Mines, Washington 25, D. C.

INJURY-FREE PLANTS

The plants, excluding the two winners, that worked 20,000 or more man-hours without a lost-time or disabling injury and were awarded Certificates of Achievement in Safety were as follows:

Lafayette dry-bank plant, Western Indiana Gravel Co., Lafayette, Ind., 131,930 man-hours.

Sun Valley dry-pit plant, Consolidated Rock Products Co., Sun Valley, Calif., 106,864 man-hours.

Centerville No. 106 wet-pit plant, Pacific Cement & Aggregates, Inc., Centerville, Calif., 100,114 man-hours.

Morris river plant, Material Service Corporation, Morris, Ill., 99,351 man-hours.

Kerlinger Plant No. 114 dry-pit, Pacific Cement & Aggregates, Inc., Tracy, Calif., 90,161 man-hours.

Brisbane No. 130 dry bank plant, Pacific Cement & Aggregates, Inc., Brisbane, Calif., 88,031 man-hours.

Quigley wet-pit plant, Fort Worth Sand and Gravel Co., Inc., Hurst, Tex., 81,233 man-hours.

Hudson wet-dry pit plant, Gifford-Hill & Co., Inc., Hearne, Tex., 80,383 man-hours.

Herndon Rock Products Plant Nos. 1 and 2 dry-bank, wet-pit, river, Stewart & Nuss, Inc., Herndon, Calif., 71,525 man-hours.

Albuquerque dry-bank plant, Albuquerque Gravel Products Co., Albuquerque, N. M., 64,889 man-hours.

Circleville dry-pit plant, The Sturm & Dillard Co., Circleville, Ohio, 59,985 man-hours.

Cayuga dry-bank plant, Material Service Corp., Cayuga, Ind., 50,746 man-hours.

South Bend dry-bank plant, Western Indiana Gravel Co., South Bend, Ind., 50,592 man-hours.

Fort Jefferson dry-wet pit plant, American Aggregates Corp., Fort Jefferson, Ohio, 48,588 man-hours.

Clayton No. 135 dry-bank plant, Pacific Cement & Aggregates, Inc., Clayton, Calif., 48,075 man-hours.

Pete dry-pit plant, Grand Prairie Construction Co., Inc., Lone Star, Tex., 47,217 man-hours.

Lebanon wet-pit plant, Lebanon Sand & Gravel Co., Lebanon, Oreg., 46,496 man-hours.

Bennett dry-bank plant, Fort Worth Sand & Gravel Co., Inc., Birdville, Tex., 44,277 man-hours.

Franklinville dry-bank plant "F", The Buffalo Slag Co., Inc., Franklinville, N. Y., 42,112 man-hours.

San Juan Capistrano dry-pit plant, Graham Brothers, Inc., San Juan Capistrano, Calif., 42,062 man-hours.

Lacon wet-pit, river plant, Consumers Co., Lacon, Ill., 41,937 man-hours.

Leesburg lake plant, Western Indiana Gravel Co., Leesburg, Ind., 41,406 man-hours.

Claremont dry-pit plant, Consolidated Rock Products Co., Claremont, Calif., 39,548 man-hours.

Lincoln wet-pit plant, The Lincoln Sand & Gravel Co., Lincoln, Ill., 38,012 man-hours.

Cottonwood Heights dry-bank plant, Utah Sand & Gravel Products Corp., Salt Lake City, Utah, 35,573 man-hours.

Marquette wet-pit Sand plant, Marquette Cement Mfg. Co., Memphis, Tenn., 34,481 man-hours.

Dresden dry-bank plant, The Zanesville Gravel Company, Dresden, Ohio, 33,809 man-hours.

Bloomington wet-pit plant, McGrath Sand & Gravel Co., Bloomington, Ill., 32,710 man-hours.

Ludlow Falls dry-wet pit plant, Steiner's Sand & Gravel Co., Ludlow Falls, Ohio, 32,509 man-hours.

Allegany dry-bank plant "A", The Buffalo Slag Co., Inc., Allegany, N. Y., 32,463 man-hours.

Boonville dry-bank No. 1 plant, Eastern Rock Products, Inc., Boonville, N. Y., 32,140 man-hours.

Milton Grove dry-bank plant, Milton Grove Sand, Inc., Milton Grove, Pa., 31,191 man-hours.

Shippingport dry-pit plant, Shippingport Sand & Gravel Co., Shippingport, Pa., 29,853 man-hours.

Montezuma dry-bank plant, Western Indiana Gravel Co., Montezuma, Ind., 29,636 man-hours.

Eddyville wet-pit plant, Concrete Materials Co., Eddyville, Iowa, 29,185 man-hours.

Raleigh dry-bank plant, Memphis Stone & Gravel Co., Memphis, Tenn., 28,802 man-hours.

Slinger dry-bank plant, Palmer Crushing Co., Slinger, Wis., 27,662 man-hours.

Sierra dry-pit plant, Consolidated Rock Products Co., Monrovia, Calif., 27,476 man-hours.

Yolo wet-pit No. 131 plant, Pacific Cement & Aggregates, Inc., Yolo, Calif., 26,311 man-hours.

Farmington wet-pit plant, Valley Limestone & Gravel Inc., Farmington, Iowa, 26,080 man-hours.

Hewitt dry-pit plant, Consolidated Rock Products Co., North Hollywood, Calif., 25,488 man-hours.

Sussex dry-bank, lake plant, Edward Lutz Sand & Gravel Co., Inc., Sussex, Wis., 25,145 man-hours.

Olympia dry-bank No. 125 plant, Pacific Cement & Aggregates, Inc., Felton, Calif., 24,796 man-hours.

Knight dry-bank plant, The Rubber City Sand & Gravel Co., Akron, Ohio, 24,662 man-hours.

Cedar Falls river plant, C. W. Shirey Co., Cedar Falls, Iowa, 23,617 man-hours.

Alfred Station dry-bank plant "AS", The Buffalo Slag Co., Inc., Alfred Station, N. Y., 23,608 man-hours.

Port Washington dry-bank plant, Metropolitan Sand & Gravel Corp., Port Washington, N. Y., 23,572 man-hours.

Coxey dry-bank plant, Industrial Silica Corp., Dundee, Ohio, 23,157 man-hours.

South Bend dry-pit plant, South Bend Sand & Gravel Corp., South Bend, Ind., 22,858 man-hours.

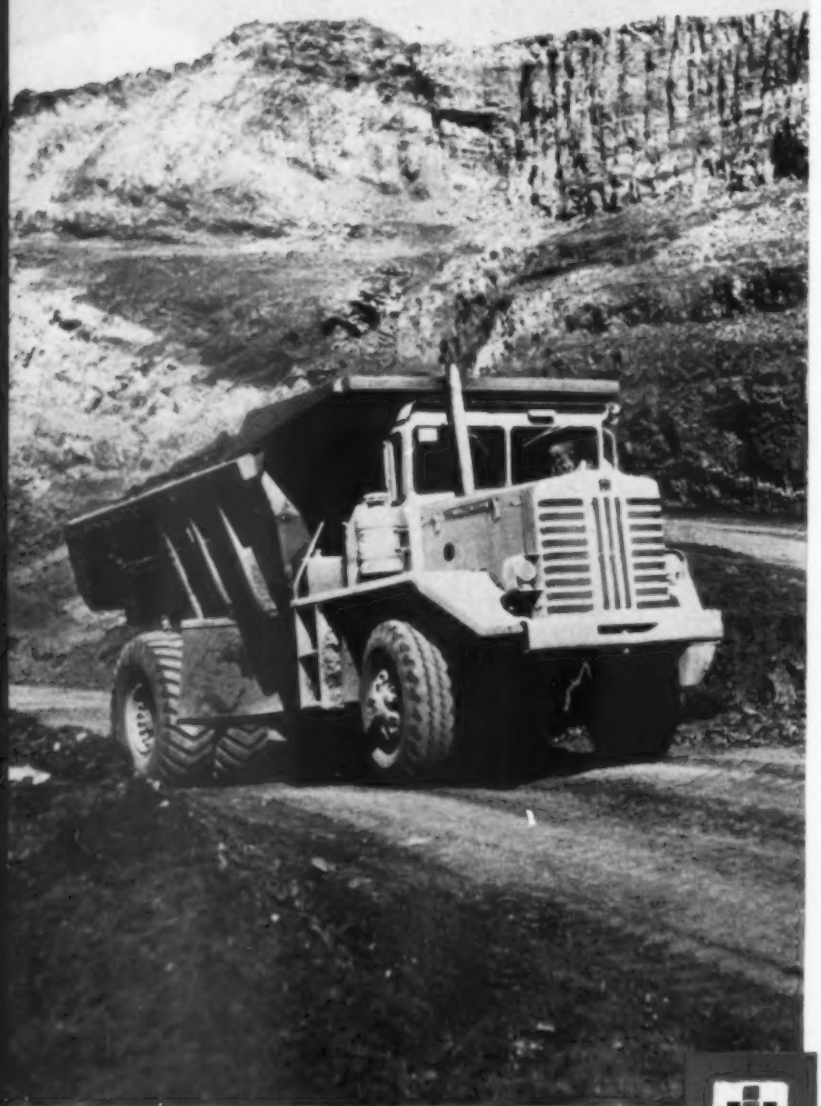
Camden bank plant, Memphis Stone & Gravel Co., Camden, Tenn., 21,824 man-hours.

Northport dry-bank plant, Metropolitan Sand & Gravel Corp., Northport, N. Y., 20,525 man-hours.

Anderson dry-bank plant, Western Indiana Gravel Co., Anderson, Ind., 20,012 man-hours.

● A & B, Inc., Odessa, Tex., has been using Autocars (Model DC75T's) like the one pictured here to replace most of its delivery fleet, and has reported that 15 percent more hauling can be done than formerly, at a 20 percent reduction of costs. These tractors, powered by 180-hp. Cummins HRF8 diesel engines, are working on a big road-building job for which they deliver approximately 2,000 t.p.d. of sand and gravel on hauls averaging 33 miles.

"95" Payhauler® beats trailer units by up to 50 seconds... *in 20% grade climb-outs!*



Phosphate mine superintendent reports "95" gains up to 100 cu. yd. daily!

A bonus-powered International "95" Payhauler®, in carefully timed tests, climbed the winding 20% grade, up to 50 seconds faster than competitive crawler-pushed trailer units!

The Payhauler, and the two "articulated" hauling units, bring out 18 cu. yd. loads apiece at the Simplot Corporation's phosphate rock mining operation near Blackfoot, Idaho.

Supt. Robert Bulard reports: "The Payhauler gains approximately 100 cu. yd. daily over our other 18 cu. yd. haul units. Not only does it have greater speed, but the Torqmatic braking gives it greater safety as well. This morning, light rain made pit roads so slippery all equipment quit except the Payhauler. It never missed a load."

Power on Payhauler rear wheels delivers top operating efficiency on steep grades or under "slick" conditions where trailer units bog down completely. Prove the fast get-away surge, the extra climbing power, and up to 25% faster haul speed of an International Payhauler. That's the exclusive result of bonus turbo-charged diesel power; road-matched and load-matched gear choice; and the power-cushioning leverage of planetary drive axles!

Try Payhauler "pick-up truck" spotting ease. Exclusive high reverse speed, "zip-around" power steering, and grade-beating power get the credit! See how 12-second dumping with double-acting hydraulic hoist speeds the cycle. See your International Construction Equipment Distributor for a Payhauler demonstration.

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Ohio Producers Group Holds Annual Meeting

THE two-day annual meeting of the Ohio Sand and Gravel Association, held on November 19-20 at the Deshler Hilton Hotel in Columbus, was generally regarded as one of the most successful and practical gatherings in the group's history. Consideration was given to a wide range of subject matter, including specifications, tax legislation, transportation, labor-management relations and labor legislation, the Ohio phase of the interstate highway program, and public relations programs for the Ohio sand and gravel industry. The latter topic was felt to be a highlight of the program in view of the improvement in that area reported during the meeting.

Among the speakers for the outstanding schedule were Ralph J. Bernhagen of the Ohio Geological Survey Division; Earl Holwadel, Ohio Gravel Co.; H. C. Atkinson, executive vice-president, Ohio Chamber of Commerce; Don W. Wiper, executive director, Ohio Manufacturers Association; Patrick H. Milligan, Sidney Sand and Gravel Co.; Ken Tobin, associate executive secretary, National Sand and Gravel Association; and Wm. Edward Hole Sr., president, American Aggregates Corp.

The banquet speakers were the Hon. Roger Cloud, speaker of the Ohio House of Representatives, and Max Ross, engineer in the Bureau of Maintenance, Ohio Department of Highways.

An interesting feature prefacing the opening session was a tour of the newly constructed South Columbus plant of American Aggregates Corporation. Approximately 60 members availed themselves of the opportunity to inspect this new facility, which incorporates the latest equipment and modern design.

During the meeting the association's officers for the new year were elected as follows: president, Wm. E. Hole Jr., American Aggregates Corp.; vice-president, Roger H. Slugg, Hamilton Gravel Co.; treasurer, W. E. Pohlman, American Aggregate Corp.; and executive secretary, Claude L. Clark.

In discussing the work of the Ohio Geological survey, Mr. Bernhagen pointed out that in comparison with similar agencies in other states the Ohio group has been hampered to some extent, due to the fact that insufficient appropriations had been made by state legislators. He indicated that the depletion of sand and gravel reserves—at a more rapid rate than the development of new resources—underscores the importance of the survey work in location of economic deposits.

The chairman of the association's public relations committee, Mr. Holwadel, cited the various efforts of his committee in driving home to the producer members the necessity for becoming public relations minded. A number of important statements pertaining to zoning and zoning laws, as well as reports on public relations by N.S.G.A. and comments on similar activity in other states, were disseminated. The speaker emphasized that sand and gravel producers must themselves, and in cooperation with others, develop greater interest in the fact that production of sand and gravel is not only important to the producer but to the public as a whole.

A discussion of recent developments in the legislative area with respect to a state "right-to-work" law was presented by Mr. Atkinson. It was noted that an effort is being made to get action in Ohio similar to that in Indiana, where such legislation was passed last year. Mr. Wiper, of the manufacturers' association, spoke on proposed federal income tax reduction as set forth in two bills now pending in Congress.

Activities of the National Sand and Gravel Association on behalf of the industry were reported by Ken Tobin, associate executive secretary of that group. In his discussion, he cited the importance to the producers of examining their records applicable to the payment of the 3 per cent transportation tax. The national group is issuing a booklet on that subject, it was noted.

The speaker's comments on percentage depletion emphasized the necessity for operators to underscore the importance of this tax relief to their respective Congressmen. Among other efforts of the N.S.G.A. referred to were prepared literature on zoning, holding open house in the interest of local public relations, manuals on land restoration, etc.

Several problems—of both local and national effect—were discussed by Wm. Edward Hole Sr., president of American Aggregates Corp. Among these were valuation procedures as set up by the state taxation department. Mr. Hole urged those present to watch appraisals closely in conjunction with personal property tax returns. The speaker also commented on federal taxation, including percentage depletion factors, as well as labor legislation. Attention was called to the trend of increased wages, and to the possibility of a business decline in 1958.

A talk on the application of heavy media separation to the beneficiation of concrete aggregates was made by I. S. Thyle of Western Machinery Co., San Francisco. Mr. Thyle illustrated his presentation with slides showing various installations and phases of beneficiation processing.

U. S. Lime Products Corp. Modernizing Sonora Mine

United States Lime Products Corporation, Los Angeles, Calif., has begun extensive renovation and modernization of hoisting facilities costing several hundred thousand dollars at its mine south of Sonora, Calif.

The project calls for new gallows headframe, a double drum hoist, and counter balance combination man-rock skips in the mine's 300 ft.-deep shaft. Work required to install and operate these facilities include retimbering the main shaft, and installing new water pump columns and electrical wiring to replace those being removed from the old hoisting compartments.

Additional plans include replacing the rock hopper with a larger unit, sinking the shaft to about 400 ft., and making preparations for mining limestone on a fifth level.

Native Aggregates, Natural Pozzolan Used In Priest Rapids Dam Concrete

By HARRY F. UTLEY

Construction of Priest Rapids Dam on the Columbia River in Central Washington by the Grant County Public Utility District got into high gear during the 1957 season. Serving as general contractor for this job, one of the country's major projects currently under way, is Merritt-Chapman & Scott Corporation, New York City. Harza Engineering Company of Chicago designed the dam and powerhouse and is supervising construction.

The main reinforced-concrete portion will be 2,427 ft. long and will extend on a straight line across the river; maximum height will be 175 ft. Right and left earthen embankments will have a total length of 5,985 ft.

About 910,000 cu. yd. of concrete is involved, and all aggregates are to be produced on the job in a modern 400-t.p.h. crushing, screening and washing plant erected by the contractor early in 1957.

A bar on the east side of the Columbia River about 1,500 ft. upstream from the site is the main source of aggregate supply. Euclid bottom-dump trucks deliver to the plant, traveling over a roadway built especially for the purpose and ending at a ramp where the loads are dumped into a receiving hopper.

Maximum size of aggregate used in batching is 6 in., and the initial step in processing is the reduction of all oversize to meet this requirement. Aided by a 42-in. by 14-ft. apron-feeder, pit-run from the hopper is passed over a 50-in. by 8-ft. vibrating grizzly which by-passes everything except the plus 6-in. boulders; these cascade to a 22-in. by 36-in. jaw crusher. The crusher product joins the grizzly throughs on a long

The receiving hopper and primary jaw crusher, where pit run is reduced to minus 6-in. size, preparatory to surge stockpiling.

inclined belt-conveyor which builds up a primary surgepile to supply the main plant.

All coarse aggregates are produced in a conventional manner by washing and sizing over a series of wet vibrating screens, oversize or surplus being diverted to a pair of cone-type crushers close-circuited with the screens. Four finished sizes— 6-, 3-, 1½-, and ¾-in.—are taken out and conveyor-stored in separate 8,000-ton capacity piles over a reclaiming tunnel.

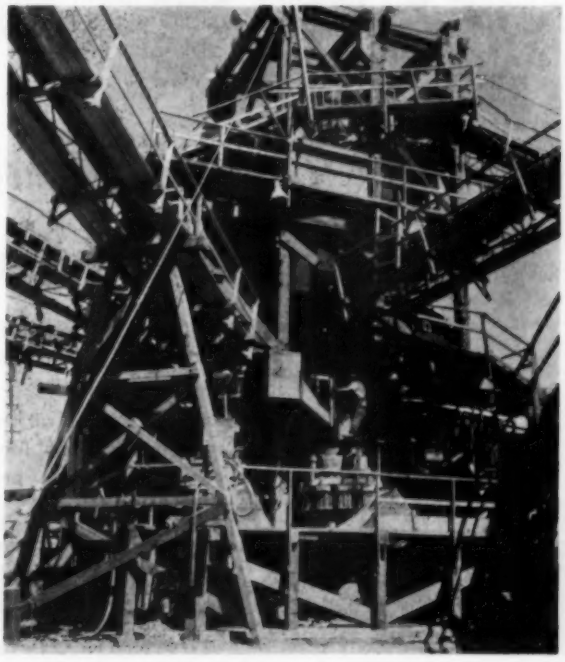
Pit-run material is deficient in fines, and a rough balance is effected by trucking in fine material from wind-blown dunes which occur in the general vicinity of the project. This material, together with the minus No. 4 mesh screen throughs, is processed and classified in a 28-ft. long water-scalping tank followed by a pair of dewatering spirals. Balance to meet gradation specifications is effected in the scalping tank by wasting some of the surplus middle-range sizes of sand. A shuttle conveyor stockpiles the finished sand.

The belt conveyor operating in the reclaiming tunnel delivers the finished aggregates directly to the bins of the concrete plant, where the batches are discharged into four 4-cu. yd. Koehring mixers.

In accordance with accepted practice, pozzolan is replacing about one-fourth of the cement in all concrete to be used. Although the Pacific Northwest abounds in volcanic deposits known to contain good natural pozzolan, most of the mass-concrete structures heretofore built in the Northwest have used a specified fly-ash which was shipped in by rail from as far away as Chicago. At Priest Rapids, however, an excellent natural pozzolan is being supplied from a plant set up just a few miles away. This facility is owned and operated by Butte Pozzolan Company, a subsidiary of Wise Construction Company, Boise, Idaho. The plant calcines and grinds a volcanic ash to yield a highly-acceptable product. The A.S.T.M. requirement that 88 percent of the product must pass 325-mesh is exceeded to the extent that actually closer to 95 percent of the finished pozzolan is in the minus 325-mesh range.

Volcanic material, after careful selection in place, is ripped and bulldozed to a crusher, screened, then calcined at 1,000 deg. F. in a rotary kiln. After calcining and cooling the pozzolan is ballmilled and air-separated in a closed-circuit arrangement. Delivery to the batch plant at the dam is by bulk-cement-type trucks and trailers. Cement arrives by rail over the C.M. & St. P. R.R.

At the central processing structure all the aggregates are washed and sized. Two cone crushers are visible in the foreground.



An overall view of the aggregates plant which is supplying material for the concrete requirements at Priest Rapids Dam. The conveyor at the right builds up the raw surgepile shown. Stacker conveyors from the screening-washing-crushing tower at the left build piles over the reclaiming conveyors delivering direct to the concrete plant.

This picture, taken from the aggregates plant, shows the concrete plant with its cement and pozzolan silos. Cofferdam cells are at the left of the small building in the center of the picture.

Unit-bid prices of the contractor reveal that the pozzolanic material is being furnished for $15 per ton; 43,000 tons must be supplied.

Construction at Priest Rapids Dam, which started in the summer of 1956, will require about four years, and about 2,500 workers will be employed at the peak of construction. The powerhouse will contain eight generators, each with a rated capacity of 78,850 kw. No federal funds or tax money is being used to build the dam, financing being by the public sale of revenue bonds will ultimately be retired through the sale of power.

When the $91,880,625 contract was awarded to Merritt-Chapman & Scott in July, 1956, it was reported to be the largest single competitively bid construction contract ever awarded. That record stood until April, 1957, when the same contracting firm won the Bureau of Reclamation's Glen Canyon Dam (Arizona) contract on its bid of $107,955,522.

Merritt-Chapman & Scott is shooting for bonus money on the Priest Rapids job. Its contract with Grant County P.U.D. calls for completion, including the installation of the generators, in 1,900 calendar days. A bonus of $1,300 per day per power unit will be paid to the contractor for putting power on the line ahead of schedule.

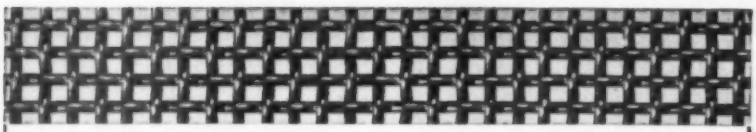
For failure to meet the schedule, though, the penalty is to be $3,000 per day per unit!

Lone Star's Washington Plant Closes for Indefinite Period

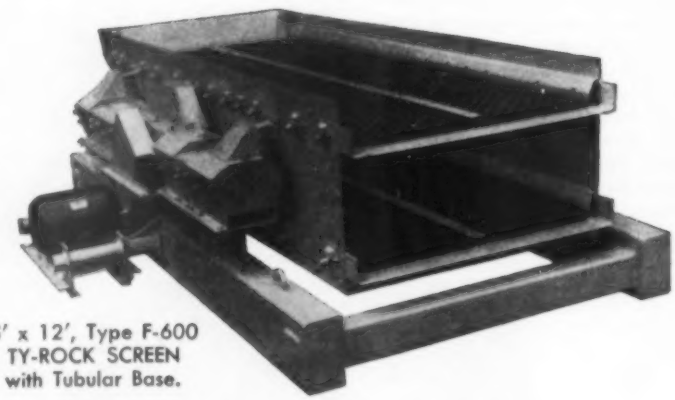
At Concrete, Wash., the Lone Star Cement Corporation's plant was closed on November 30 for an indefinite period. According to local sources, the plant was shut down because of the long strike of last summer. Storage tanks had been refilled; and the normal slackening of construction came at a time when it was impossible to bring plant inventories down sufficiently to continue operations through the winter.

It was stated that shipping will continue, and the full-scale operation will be resumed as soon as storage capacity becomes available.

HENRY H. LINEAWEAVER, owner of the Wellsboro Lime Company, Wellsboro, Pa., died recently in a hospital of that city.



FOR PROFITABLE SCREENING USE



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Universal's 880 Senior "R" on the Rocky Ridge Road project site. Has 30" x 26" rolls teamed with a full 48 sq. ft. of screening area.

"On this project a Universal Crusher was the lifeline of our operation"

says George Scott, partner in the firm of Stecker & Scott, pictured on the Rocky Ridge Road project, north of Sacramento, California.

"Rocky Ridge Road project called for 5½ miles of 1½" base course, nine inches thick, with 8-foot shoulders on two, 12-foot lanes. We crushed the material from 230,000 cubic yards of lava formation excavated for the cuts. In placing our low bid, we put a lot of faith in our heavy equipment, especially the Universal 880 Senior "R" Gravelmaster

"A breakdown on our crushing operation would have idled 15 men and eight pieces of equipment. Considering operating costs and a tight profit margin, the importance of keeping all men working continuously was obvious. The Universal 880 Senior "R" kept men and material moving. We didn't miss a deadline.

"As far as production is concerned, the unit really proved itself. With this kind of performance we can bid even closer on future jobs."

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The Universal 880 Senior "R" will give *your* operation these same benefits . . . dependability, low maintenance, high production . . . for protection of tight profit margins.

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CONVERSION TO GAS

Increases lime output at Mercer Lime & Stone Co.

STEP-BY-STEP conversion of its lime kilns from hand-firing to Azbe center-firing with natural gas has upped daily production from 20 tons of calcined lime to over 65 tons per kiln at the Mercer Lime and Stone Company, Branchton, Pa. The four vertical natural gas-fired shaft kilns now in operation at the Mercer plant process chiefly high-grade limestone for use in the steel mills in southwestern Pennsylvania.

The change in Mercer's operation began to take place gradually, according to a long-range plan, in 1951. At that time the company produced mostly agricultural lime from native Pennsylvania limestone. Now it has a unified operation which produces pebble lime for the steel industry, chemical lime for water purification, and lime for agricultural purposes.

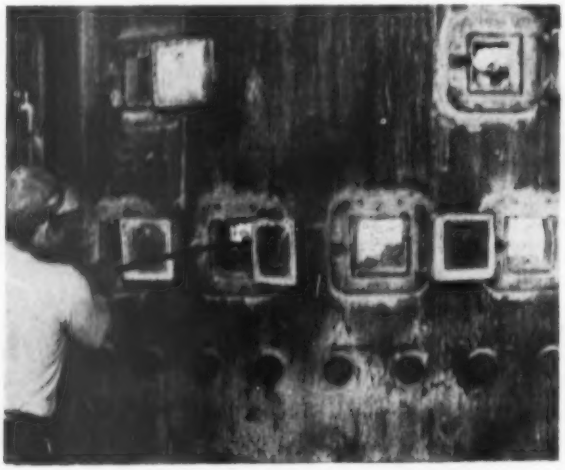
Prior to conversion, the shaft kilns were fueled by hand-fed coal fireboxes attached to the kiln. Heat from the fireboxes entered the kiln over a bridge wall at the bottom of the hot zone and circulated through the charge.

The initial conversion to gas, following plans worked out with the Manufacturer's Light & Heat Company of the Columbia Gas System, was made by covering the existing firebox grates and partially filling the fireboxes with brickbats. Long burner pipes were installed through the fire doors, with the ends of the pipes at or near the bridge wall. These pipes were equipped with mixers, and the gas was introduced through a spud which permitted entrainment of some primary air.

This system was inexpensive to install and was a big improvement over the old method. The amount of primary air used for the combustion of the gas was quite limited, causing a long and somewhat luminous flame at the pipe end. The heat entered the kiln in the same way, at the bridge wall which had been provided for the coal firing. Over a period of several years, production from each kiln was raised from the initial 20 tons per day to 30 to 35 tons. This was accomplished by progressive improvements as experience was gained in operation.

The next step in the planned improvement program at Mercer was a big one, involving a complete kiln renovation program and the adoption of the Azbe design for kiln firing. To accomplish this, the old kilns were rebuilt from the foundation up. The original structurals, including the casing plates, were replaced at a cost of $50,000; and in addition $8,000 to $10,000 per kiln was spent on improving the original installation.

With the completion of the modernization, output per kiln jumped



Periodically, burning lime in the kiln is agitated with a poker inserted through the ports. The poker is also used to dislodge accumulated crust from the chamber.

Unburned lime is removed at a picking table fed by three chutes. The belt on the table feeds lime directly to the crusher.

to approximately 65 tons per kiln per 24 hours; this was made possible by the uniformity of heat distribution and lengthening of the hot zone.

The heart of the Azbe design, used by Mercer Lime & Stone, consists of a brick structure centered on and spanning the diameter of the kiln at the bottom of the hot zone. This structure contains multiple small ports that introduce heat into the kiln horizontally. Similar ports are provided in the side walls, parallel to the on-diameter structure. These ports also deliver heat horizontally, toward the center ports, and control the heat input or distribution. The kiln design also provided for the recirculation of a portion of the kiln gases, which have a high carbon dioxide content.

Gas to fire the kilns is delivered to the Mercer plant at a pressure of approximately 20 lb., and is regulated to approximately 10 lb. at the orifice meters that measure gas to the individual kilns. Throttle valves which control gas input to the individual burners are equipped with manometers on the down-stream side. Pressures, after throttling, are in the range of 1½ to 3 lb.

The gas burners within the kilns consist of a short length of ¾-in or 1-in. pipe. A metal spiral is inserted into the pipe near the discharge end to give the gas a swirling motion and to improve mixing.

Briefly, this is the production sequence now used by Mercer Lime. When the limestone arrives at the plant, it is burned in the gas-fired Azbe kilns at temperatures ranging from 2,000 to 2,600 deg. F. From the kilns, lime is conveyed automatically to a 15-ft. picking table fed by three chutes. After the picking stage the calcined lime feeds directly into the crusher. Following this it is screened.

Lime too small to pass as pebble lime is crushed again by a hammermill, hydrated, cured, and run through a separator. Lime that does not separate is mixed with the tailing of the original burning process to produce agricultural lime.

To supply the intense, controllable heat needed to operate the kilns, Mercer uses between 27 and 28 million cu. ft. of natural gas per month, supplied by the Manufacturer's Light & Heat Co. The kilns are the continuous-operation type, running around the clock, to produce a daily output of approximately 260 tons of the various grades of lime.

At present the limestone is received at Mercer Lime & Stone in a wide range of sizes, varying from 3 in., or smaller, up to 12 in. The next step toward higher efficiency is a company plan to control stone size within 3 in. to 5 in. and to install a skip hoist to move the stone from a point below its railroad siding to the charging point at the top of the kilns.

From the time of the initial conversion to gas to the present operation of the Azbe design kilns, Mercer has steadily improved the efficiency of its operation. At the same time, fuel requirements have dropped from approximately 7 million B.t.u. per ton to 4 million B.t.u. per ton. The controllability and cleanliness of gas fuel has also permitted the firm to market a premium product, as compared with the agricultural lime which was the predominant portion of its earlier output.

A load is leveled for shipment. In the background is one of the four continuous-operation Azbe kilns having a daily capacity of 65 to 70 tons.

Kaiser Exploration Company To Mine Bauxite in Panama

Kaiser Aluminum & Chemical Corporation, Oakland, Calif., has obtained a bauxite exploration and mining concession from the government of Panama.

The contract, which is the first bauxite concession ever granted by the Panamanian government, gives the Kaiser Exploration Company, a wholly-owned subsidiary of Kaiser Aluminum, exclusive exploration and mining rights in a large area of western Panama near the Costa Rican border. The agreement has been signed by President Ernesto De La Guardia Jr., and sent to the legislative assembly for approval.

Cemento Carabobo, C. A., Venezuela's third-largest cement producing company, is doubling capacity of its subsidiary, Ceramica Carabobo. The parent concern recently increased its capital by more than $2,000,000 to finance expansion and the acquisition of new equipment.

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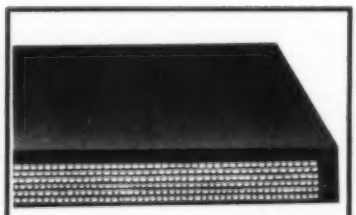

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C. D. Curtiss Retires From Bureau of Roads—Receives Bartlett Award

C. D. Curtiss has retired from his post as commissioner of the Bureau of Public Roads after 38 years of service with this agency. His successor will be named by the Secretary of Commerce.

At the recent national convention of the American Association of State Highway Officials in Chicago, Mr. Curtiss was presented with the annual Bartlett Award. This honor is presented to the person judged to have contributed most during the year to the highway cause. The recipient is chosen by a board composed of the presidents of the American Road Builders Association, the A.A.S.H.O., and the chairman of the Highway Research Board of the National Academy of Sciences.

'56 Sand-Gravel Output Rises—California Leads All States

Output of sand and gravel in 1956, as reported by producers to the Bureau of Mines, United States Department of the Interior, totalled 625,000,000 short tons, valued at $596,000,000. This compares with 592,000,000 short tons, valued at $536,000,000, reported in 1955. Approximately 75 percent was produced at commercial operations and the remainder at government-and-contractor operations.

California led in output as in the previous year, producing more than twice as much as any other state; Michigan was second; Illinois, third, followed by Ohio, Texas, Minnesota, New York, Wisconsin, Washington, and Indiana in that order. These ten states accounted for over half of the total United States production.

Transportation—The trend toward truck transportation continued in 1956, as producers reported that 80 percent of all sand and gravel produced was hauled by this method, an increase of 3 percent over 1955. Rail haulage dropped 1 percent to 13 percent in 1956. Waterway transport, important in certain localities, accounted for only 4 percent of the total. The remaining 3 percent was unspecified.

Output of sand and gravel by commercial producers totaled 469,899,000 short tons in 1956, compared with 420,076,000 tons in 1955. The average value per ton was $1.07, compared with $1.04 in 1955.

Industrial sand production totaled 19,059,000 tons, 2 percent more than in 1955. Increases were noted for glass, fire or furnace, and filter sands, but molding, grinding and polishing,

and engine sands decreased, compared with 1955.

Glass sand—Production of glass sand in 1956 totaled 6,837,000 tons in 1956 with an average value of $2.86 per ton, an increase of 10 percent in tonnage and 4 percent in average value over 1955.

Molding sand—Output of molding sand decreased 4 percent in tonnage but increased 9 percent in average value. Production in 1956 totaled 7,962,000 short tons, valued at $16,640,000. Major producing states in order of output were new Jersey, Michigan, Illinois, and Wisconsin.

Grinding and polishing sand (including blast sand) — Output of abrasive sands decreased 4 percent, compared with 1955. Total production totaled 1,669,000 short tons, with an average value of $3.15 per ton. The average value was 18 percent higher than in the previous year.

Fire or furnace sand—Production of fire or furnace sand increased 26 percent in tonnage to 687,000 short tons, and the average value remained at $2.03 per ton in 1956.

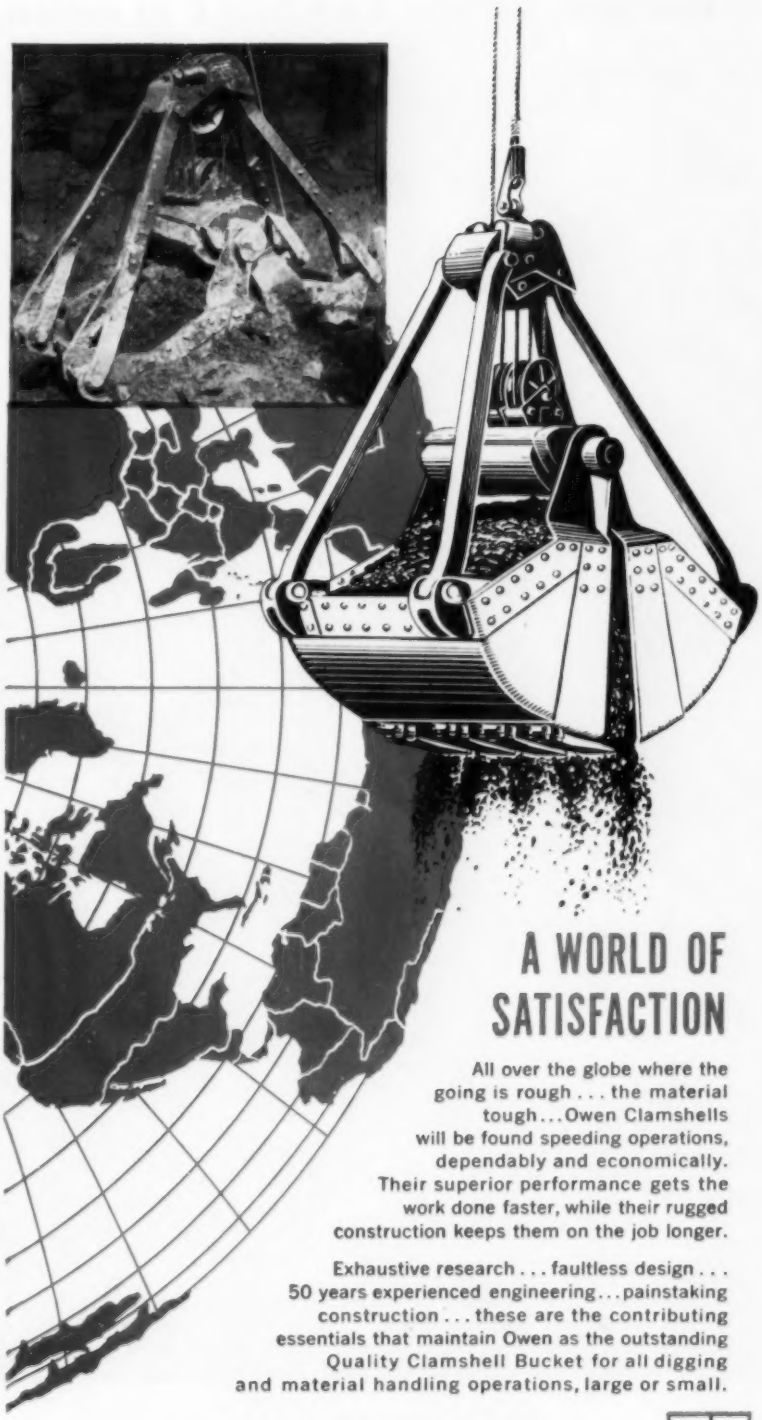
Engine sand—Production of engine sand in 1956 totaled 1,356,000 tons, with an average value of $1.35 per ton.

Filter sand—Output of filter sand in 1956 totaled 549,000 tons, valued at $849,000. The average value for 1956 was 4 percent higher than in the previous year.

Output by government-and-contractor operations totaled 155,483,000 short tons in 1956, compared with 172,077,000 tons in 1955. Approximately 52 percent of the total quantity in 1956 was washed, screened, or otherwise prepared. The average value of prepared sand and gravel was 76 cents per ton, while the average value of unprepared material was 43 cents per ton.

Construction and maintenance crews of states, counties, municipalities, and other government agencies produced 48,000,000 tons, valued at 48 cents per ton, and contractors working expressly for those agencies produced 107,000,000 tons, valued at 65 cents per ton. Output by states and their contractors accounted for 61 percent of total government-and-contractor production, while counties accounted for 26 percent, and municipalities, 3 percent. The remaining 10 percent was produced by or for federal agencies.

DAVID F. SHAW has been appointed vice-president of Kaiser Engineers, division of Henry J. Kaiser Company, Oakland, Calif.



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KOEHRING WORK CAPACITY *in action . . .*

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"Diving" for gravel — Loading out of a water-filled gravel pit (right), this 405 dragline puts production on a big-tonnage basis. It has plenty of work-radius for this type of operation — can be used with 40 to 90 feet of boom, and handles 1 to 1½ cu. yd. bucket depending on weight of materials. Check its other work capacities on opposite page, then let your Koehring distributor show you what the 405 will do for you.

Re-working a slag bank — Once cast aside as waste, slag is now being reclaimed from this bank, run through a crusher, and used as sub-base material on road construction. During the process, slag is swept by a magnet to remove any scrap metal. Here, a Koehring 1½-yard 605 shovel loads the slag into Dumptors for haul to crushing plant. This combination of Koehring shovels and Dumptors makes a heavy-duty, high-production team. 6-yard Dumptor® climbs 24% grades fully loaded, dumps in one second, travels at same high speeds in either direction — no need to turn.

Mining copper ore — At this open-pit mine in the Southwest, overburden has been stripped down to pay-dirt. Next, a Koehring ½-yard 205 loads out copper-bearing ore for haul to smelter. Powerful crowd, fast retract, smooth swing, and instant dipper-trip speed production in the pit, keep trucks on the run.

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305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-ft. radius
305 ON RUBBER	¾-Yd.	30,000 lbs. 15,800 lbs.	at 10-ft. radius at 30-ft. radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-ft. radius
445 ON RUBBER	(Crane only)	90,000 lbs. 40,000 lbs.	at 15 ft. radius at 25-ft. radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-ft. radius
805 CRAWLER	2-Yds.	104,200 lbs.	at 12-ft. radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 12-ft. radius

Want more information? *See Koehring distributor.*

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More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

FILM-FORMING REAGENT S-3152, developed by the *American Cyanamid Company,* forms protective crusts over mineral fines in stockpiles or open railroad cars. Diluted with water and sprayed on the surface of the ore, it forms a tough crust which prevents wind and rain erosion. Samples of Reagent S-3152 and technical notes on its use are available. (1)

BLAW-KNOX GRAVEL BENEFICIATION is described in a booklet issued by the *Blaw-Knox Company.* The booklet explains the elastic fractionation theory of the firm's gravel beneficiation process, how the process works, and actual results. (2)

A NEW ROTARY CAR DUMPER, developed by *Heyl & Patterson, Inc.,* is described in a catalog which explains design and operational features. A table of dimensions, a cut-away view, and action photos are included. (3)

MC NALLY PITTSBURG PROFILE, a new brochure released by *The McNally Pittsburg Manufacturing Company,* contains a description of the products and physical facilities of the company. Photos depict all phases of production at the company's Pittsburg, Kans., and Wellston, Ohio, plants. (4)

HARDSURFACING for preventive maintenance with Ranite welding electrodes is discussed in a brochure published by the *Rankin Manufacturing Company.* A guide for selecting the proper hardsurfacing rod for various wear conditions, and an explanation of a new method for keeping records of equipment wear are included. (5)

SPROCKETS CATALOG NO. 21, newly revised by the *Farrell-Cheek Steel Company,* contains specifications and engineering data on the firm's complete line of cast steel sprockets. (6)

PORTABLE HYDRAULIC PIPE LINE DREDGES are discussed in a 12-page bulletin offered by the *Ellicott Machine Corporation.* Photographs show the "Dragon" model dredges in a variety of applications. Engineering and design factors are explained. (7)

COTTON-NYLON CONVEYOR BELTING is described in a bulletin issued by the *Republic Rubber Division, Lee Rubber & Tire Corporation.* Strength, proportions, and cotton belt comparisons are included. (8)

A MAINTENANCE GUIDE for Cat D2, D4, and D6 tractors has been prepared by the *Caterpillar Tractor Company* to supplement the more detailed information in Caterpillar "Operation and Maintenance" books. Over 80 color drawings illustrate helpful service tips. (9)

TOTALLY-PROTECTED A. C. MOTORS from 1 through 125 hp. are discussed in Bulletin B-2506, published by the *Reliance Electric and Engineering Company.* An illustrated explanation of Total Protection is presented. (10)

TANK WEIGHING as a measurement of tank contents is detailed in a brochure released by *The A. H. Emery Company.* Covered in the bulletin is the use of the Emery hydraulic load cell as the load sensing device in an Emery weighing system. (11)

THE AIRMERGE SYSTEM of quadrant blending is described in Bulletin B-1, available from the *Fuller Company.* The literature discusses a typical Airmerge installation, the development of Airmerge, and principles of Airmerge blending. (12)

MODEL SP-107 SHOVEL-CRANE is covered in a catalog just published by *The Thew Shovel Company.* Features of the ⅜ cu. yd. self-propelled unit are detailed. Photos demonstrate its maneuverability and the tractive effort for off-the-highway travel. (13)

A NEW WELDING SUPPLIES CATALOG is now available from the *Air Reduction Sales Company.* Complete information on ferrous and non-ferrous welding rods for gas and arc welding is presented. (14)

FIRST CLASS
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Pit and Quarry Publications

431 South Dearborn Street

CHICAGO 5, ILL., U.S.A.

JANUARY, 1958

Please send more information on circled items described in this issue.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89											

In addition I would like information on:

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Name _____ **Title** _____

Company _____

Address _____

City _____ **Zone** _____ **State** _____

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

PLASTER AND ACOUSTICAL SYSTEMS are treated in a folder announced by the *Zonolite Company*. Principle applications are discussed. Specifications, fire test data, and general technical information are included. **(15)**

ROPE-OLOGY NO. 50, a publication of the *Macwhyte Company*, shows examples of equipment manufacturers using prefabricated "Safe-Lock" wire rope assemblies. **(16)**

MACHINERY MAINTENANCE, an illustrated booklet describing IRD systems for reducing costs on maintenance and quality control, is offered by the *International Research and Development Corporation*. This booklet lists the applications and operating ranges of each model. **(17)**

THE LOAD LUGGER SYSTEM—a number of detachable steel containers handled by a standard truck equipped with a specially engineered hydraulic hoist mechanism—is fully described in Bulletin 457, published by the *Ingersoll Kalamazoo Div., Borg-Warner Corporation*. **(18)**

THE MOHAWK portable primary crushing plant manufactured by *Lipp-Mann Engineering Works, Inc.*, is featured in a bulletin containing details and specifications on the four available sizes. **(19)**

SPEED VARIATORS from 3 through 150 hp. are described in Bulletin GEA-6643, released by *General Electric*. Included is a Power Unit Data Slide Rule for calculating case dimensions, horsepower, speed range, power unit weight, and motor frame size. **(20)**

SPECIALIZED DRIVES AND MOTORS engineered and built by the *Reliance Electric and Engineering Company* are discussed in a new booklet. A.c. motors to 400 hp., d.c. units to 1,000 hp., d.c. and a.c. generators and motor-generator sets, gearmotors, and variable-speed drive systems and their control are some of the units described. **(21)**

ACKER DRILL COMPANY, INC., has issued Bulletin 100, which contains a description, specifications, and illustrations of the Acker Packsack diamond core drill. Acker recently acquired U. S. manufacturing rights for the Packsack, originally developed in Canada. **(22)**

WHEELS AND ROLLERS CATALOG NO. 24, available from the *Farrell-Cheek Steel Company*, includes illustrations, specifications, and engineering data. The back cover illustrates other literature available which describes numerous product line divisions. **(23)**

CROSBY-LAUGHLIN AND LEBUS FITTINGS for wire rope and chain are covered in Catalog No. 950-2, released by the *Crosby-Laughlin Div., American Hoist & Derrick Company*. Specifications, dimensions, rated capacities and weights are included. **(24)**

THE WHITE MOTOR COMPANY is issuing the 36th annual edition of its Cost Record Book for truck fleets. Revised for modern fleet cost practices, the book is available to all fleet and truck operators. **(25)**

WEATHER-PROTECTED MOTORS are discussed in a new bulletin released by the *Allis-Chalmers Manufacturing Company*. Construction and mechanical features of the motors are detailed. **(26)**

RX SLURRY PUMPS available from the *Morris Machine Works* are described in Bulletin 185, which gives capacities and applications, and provides operating data and specifications for continuous duty—heavy, fine, or coarse slurries. **(27)**

AN INDUSTRIAL GLOVE CATALOG has been released by *The Pioneer Rubber Company*. Fully illustrated catalog sheets give complete specifications and factual information on the entire line of Pioneer industrial gloves. **(28)**

CENTRIFUGAL PUMPS designed for continuous-duty operation within the medium pressure range are described in a flier published by *Ingersoll-Rand*. Cross-sectional views and a complete table of pump dimensions are included. **(29)**

JANUARY, 1958

Please send more information on circled items described in this issue.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
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In addition I would like information on:

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Name _____ **Title** _____

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Knot shown is the clove hitch, made in Plain or Reinforced Primacord and drawn tightly around the Plastic Reinforced Primacord.

Plastic Reinforced Primacord Branch Line, recommended for extremely deep holes — also river crossings and other wet conditions. Covered with a tough plastic material — waterproof and resistant to acids commonly encountered. Tensile strength 275 lbs. 1000-ft spool weighs 22 lbs.

Don't Worry... use Primacord

Why worry about stray electrical currents when you can hook-up and detonate with Primacord? It acts as the detonating agent throughout the entire column of explosives, or furnishes initiation to primers of blasting agents. This means safer, easier, quicker loading. It connects all holes. This means that you can plan your shots to obtain better fragmentation.

When your blast is loaded and hooked up, it cannot be set off by normal vibration or friction, ordinary impact or sparks, *or stray electrical currents.* Even a direct hit by lightning failed to detonate it. Primacord must be detonated with fuse and cap or electric blasting cap.

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Primacord® and Detacord® Detonating Fuse, Safety Fuse, Ignitacord®, Quarrycord®, Pyrotechnical Devices and Blasting Accessories

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Reinforced Primacord Trunk Line — also recommended for deep holes where normal strength and resistance to abrasion and cutting are needed. Textile reinforced (yellow with red thread), tough, resilient, flexible. Tensile strength 160 lbs. 1000-ft. spool weighs 19 lbs.

P-b

N.S.G.A.-N.R.M.C.A. Convention Program

Conrad Hilton Hotel, Chicago, Ill., Feb. 10-14, 1958

WEDNESDAY, FEBRUARY 12

9:30—Session 1 (simultaneous with Session 2)

Waldorf Room

NATIONAL SAND AND GRAVEL ASSN.

Address of the president—Roy E. Weaver, N.S.G.A.

"The Public Relations Program of the Sand and Gravel Industry Moves Ahead"—E. K. Davison, chairman, Committee on Public Relations. A new film on land restoration, produced by the American Aggregates Corporation, Greenville, Ohio.

"How Do Zoning Boards Get Their Power; How Do They Use It?"—Richard E. Hole, Attorney-at-Law, Greenville, Ohio.

Severance Taxes—Harold M. Lacy, Dallas Concrete Co., Dallas, Texas.

"Is Sand and Gravel Transportation by Railroad Beginning to be Only a Memory?"—Ellis E. Jensen, Janesville Sand & Gravel Co., Janesville, Wis.

Election of officers

Presentation of safety trophies

WEDNESDAY, FEBRUARY 12

9:30 a.m.—Session 2 (simultaneous with Session 1)

Williford Room

NATIONAL READY MIXED CONCRETE ASSOCIATION

Presiding officer—John W. Roberts, president

Address of the president—John W. Roberts

"Selling More Ready Mixed Concrete Through Sales Promotion"—George M. Paris, Portland Cement Association, Chicago, Ill.

"Community Good Will Is Essential to Survival of the Ready Mixed Concrete Industry"—Ralph H. Anderson, chairman committee on public relations.

Paper on Cement Tests—Stanton Walker, director of engineering

Election of officers

Presentation of safety trophies

Wednesday Morning Session*

NATIONAL READY MIXED CONCRETE ASSOCIATION

Presiding officer—John W. Roberts

"The Uniformity of Concrete Strength as Affected by Cement"—Stanton Walker

WEDNESDAY, FEBRUARY 12

Grand Ballroom

NATIONAL SAND AND GRAVEL ASSOCIATION

NATIONAL READY MIXED CONCRETE ASSOCIATION

Presiding officer—John W. Roberts

12:30 p.m.—Joint luncheon

"Man Looks at a Small Planet"—Dr. Joseph Kaplan, chairman, U. S. National Committee for the International Geophysical Year

2:30 p.m.—Waldorf Room

Conference on the N.R.M.C.A.-N.S.G.A. group insurance plan and retirement plan

Presiding officer—William Moore

"How the N.R.M.C.A.-N.S.G.A. Group Insurance Plan Works"—Kenneth E. Tobin Jr., associate executive secretary

"The New Major Medical Benefits Provided for in the Group Insurance Plan"—Jermain B. Porter, John Hancock Mutual Life Insurance Co., Boston, Mass.

"The New N.S.G.A.-N.R.M.C.A. Retirement Program for Officers and Employees of Active and Associate Member Companies"—Donald Shepherd, plan consultant, Quincy, Mass.

THURSDAY, FEBRUARY 13

9:30—Session 3 (simultaneous with Session 4)

Waldorf Room

NATIONAL SAND AND GRAVEL ASSOCIATION

NATIONAL READY MIXED CONCRETE ASSOCIATION

Presiding officer—E. Phil Gemmer

"Recent Tax Developments Affecting Sand and Gravel and Ready Mixed Concrete Producers"—John T. Sapienza, counsel for both associations, Washington, D. C.

Problems of Industry Management—An informal discussion of problems confronting management in the sand and gravel and ready-mixed concrete industries, including depreciation schedules and establishment of salvage values; Treasury regulations on expense account allowances; percentage depletion deductions; 3% tax on the transportation of property for hire; cost determination and cost management; problem of adequate insurance protection against actual and potential liabilities of the company; and other problems which arise in financial management.

Mr. Sapienza

Eugene J. Halter
J. K. Davison & Bro.
Pittsburgh, Pa.
Henry H. Kirwin
Eastern Rock Products, Inc.
Utica, N. Y.
John W. Murphy
Union Sand and Gravel Co.
Spokane, Wash.
J. H. Reid
Consolidated Sand and Gravel Ltd.
Toronto, Ontario, Canada

This part of the program is designed for audience participation.

Thursday Morning Session

NATIONAL READY MIXED CONCRETE ASSOCIATION

Presiding officer—William J. Hicklin

Open forum discussion on some plant operating problems.

(Discussion leaders to be selected)

(a) Dust control
(b) Cleaning trucks
(c) Disposal of solids from waste water
(d) Heating aggregates
(e) Hand inspected cement

"Use of Ready Mixed Concrete in Concrete Pavement Construction." (Speaker to be selected).

"A Review of Information on Concrete Admixtures"—Delmar L. Bloem.

THURSDAY, FEBRUARY 13

2:00—Session 5 (simultaneous with Session 6)

Grand Ballroom

NATIONAL SAND AND GRAVEL ASSOCIATION

NATIONAL READY MIXED CONCRETE ASSOCIATION

Presiding officer—M. Eugene Sundt

"Mobile Radio Problems: Crowded Frequencies, Eligibility Restrictions and Proposed Solutions"—Ernest W. Jennes, counsel for both associations, Washington, D. C.

"The Interstate Highway Program Moves Ahead"—Frank M. Turner deputy commissioner and chief engineer, U. S. Bureau of Public Roads.

Panel Discussion

"How Much Business Will There be for the Sand and Gravel and Ready Mixed Concrete Industries in 1958? What Happened and Why?"

C. G. Cooley
Cooley Gravel Co., Denver, Colo.
Norman J. Fredericks
Koenig Coal & Supply Co., Detroit, Mich.
Richard K. Humphries
Pacific Cement & Aggregates, Inc.
San Francisco, Calif.
Herbert G. Jahncke
Jahncke Service, Inc., New Orleans, La.
E. J. Nunan
Buffalo Slag Co., Inc., Buffalo, N. Y.
J. L. Shiely Jr.
J. L. Shiely Company, St. Paul, Minn.

Thursday Afternoon Session*

NATIONAL SAND AND GRAVEL ASSOCIATION

Presiding officer—E. K. Davison

"Current Developments in Gravel Beneficiation"—W. L. Price, Dravo.

"A Sand and Gravel Plant Designed for Uniform Grading Control"—Richard Campbell, Harry T. Campbell Sons' Corporation, Towson, Md.

"Gravel for Railroad Ballast"—Rockwell Smith, research engineer, roadway, American Association of Railroads.

"The Field for Sand and Gravel in Bituminous Mixtures"—James C. Johnson, staff engineer, Asphalt Institute, College Park, Md.

FRIDAY, FEBRUARY 14

9:30—Session 7 (Simultaneous with Session 8)

Grand Ballroom

N.S.G.A.-N.R.M.C.A.

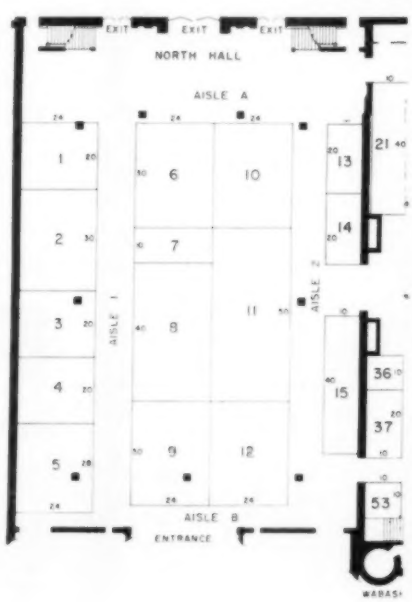
Presiding officer—F. E. Schouweiler

"Recent Labor Board and Court Developments in Group Bargaining by Employers; Illegal Picketing and Secondary Boycotts"—Charles A. Horsky, counsel for both associations, Washington, D. C.

(Continued on page 177)

*Sections of tentative engineering session program.

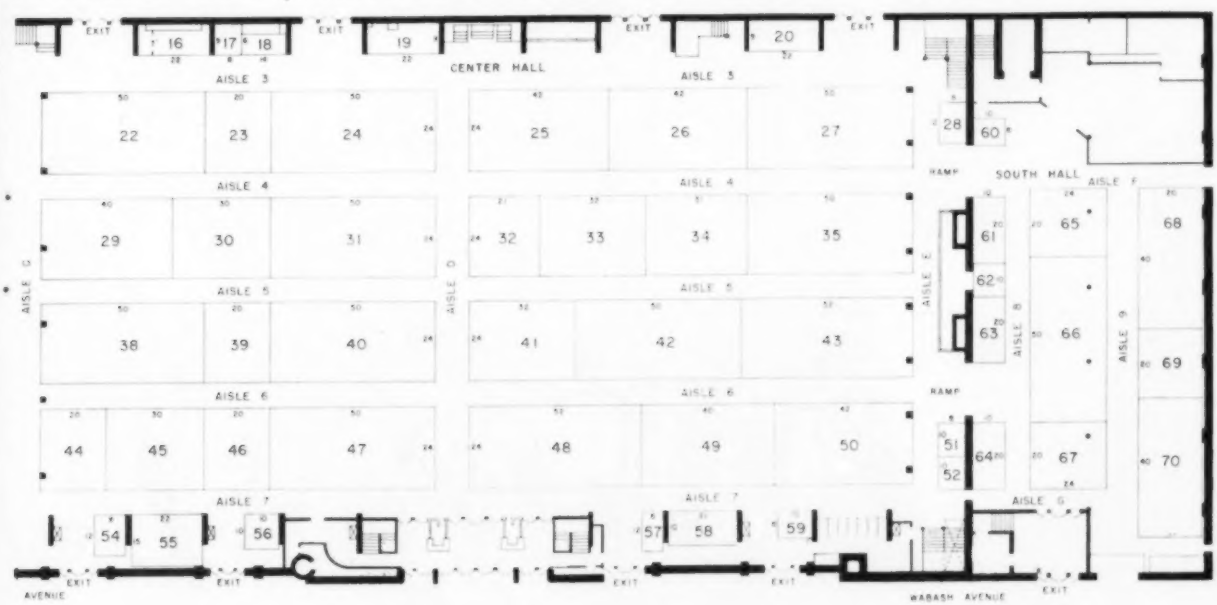
COMBIN



Exhibits at the Chicago Coliseum
N.S.G.A. and N.R.M.C.A. Equipment Show

EXHIBITOR	PRODUCTS SHOWN	BOOTH	EXHIBIT PERSONNEL
Allis-Chalmers Mfg. Co.	Tractor group: tractor shovel, rock wagon, engine and generator sets. Industries group: screens, crushers, pumps, drives	48	G. P. Molzahn, R. M. Stone, J. M. Haile, A. E. Thode, R. G. Goodden, D. E. Cavanaugh, J. C. Collier, E. H. Baxa, J. E. Dunn, F. E. Briber, A. Goldberg, R. N. Brown
American Hoist & Derrick Co.	New 40-ton truck crane with exclusive outrigger system	33	P. Bradley, J. P. Heihn, N. Hall
Barber-Greene Co.	New type feeders, screens handling wet, sticky materials. Conveyor section, photo display	26	H. W. Newton
Blaw-Knox Co. Construction Equipment Div.	Truck mixers — rear engine drive and front engine power take-off. Models new design loading plant and beneficiation plant	50	P. J. Wolfert, L. H. DeVilling, G. M. Moritz, J. P. Cullen, W. F. Simmons, W. E. Balliet, J. C. McQuide
Bostrom Manufacturing Co.	Simulated truck demonstrator model of suspension seating	36	J. J. Gibbons, D. F. Radtke
L. Burmeister Div. Chain Belt Co.	New versions portable batching plants	55	W. Stuller, O. Spanley, R. W. Strehlow, D. Zipter, A. Ross, C. Schroedl, J. Campbell, F. Borchardt, D. Lesczynski
Butler Bin Co.	New model portable ready-mix plant, new type cement feeders employing air flow method	23	Morgan R. Butler, Kenneth Kerr, Val McLean
Caterpillar Tractor Co.	New engine and drive units, tractor equipment with new side-dump bucket attachment	38	J. P. Morgan, Eldon Koetter, R. Lord, B. Bessert
Chain Belt Co.	Standard and separate engine drive truck mixers. Chain and transmission, conveyor, and bearing products	42	W. C. Messinger, R. V. Krikorian, D. B. Lovejoy, C. A. Christy
Clark Equipment Co. Construction Machinery Div.	Film on tractor shovel job applications	11	J. L. Dorfler
Columbia-Southern Chemical Corp.	Photo display, literature	59	
Concrete Transport Mixer Co.	New type truck mixers, drives	16 46	T. H. Fleming, O. H. Manchester, P. W. Schreiter, Jack Meister, F. W. Rechsteiner
Construction Machinery Co.	Truck mixers, drives of late design. Working models of drives, swing-out hoppers	24	W. A. Holden, G. A. Loveall, H. H. Holden, E. R. Daley, J. C. Graham, P. L. Weideman, J. C. Hamilton, C. P. Homann, J. Maxwell, C. D. Blake, G. Kemmerer, G. A. Larsen
Continental Motors Corp.	Cut-aways of diesel, gasoline engines, LPG engine. General service display	64	C. W. Johnson, C. M. Bellinger, W. E. Fix, G. W. Somers, C. E. Lathrop, S. A. Demilio, P. Valk

ED BIENNIAL SHOW – CHICAGO COLISEUM, FEBRUARY 10-13, 1958



Quarry work's brutal on equipment. Are your engines ready for a full season?

Each engine on your job is a key unit. A failure during the work season ahead could tie up your spread and wreck contract dates. So a look at your engine lineup now will pay dividends.

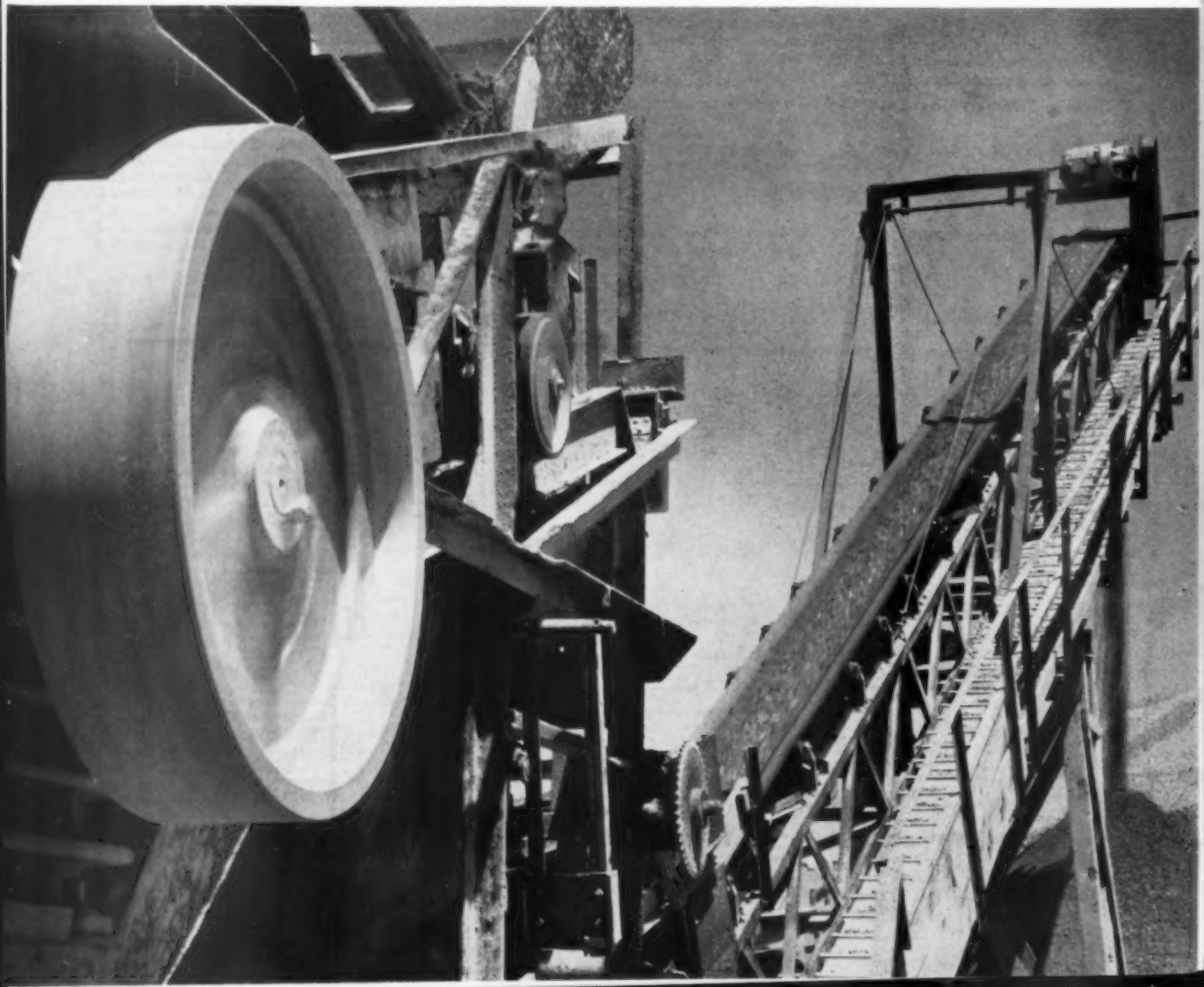
For the *tough* work, you can't beat a CAT* Engine for dependability, low operating cost and top production. That's why the men whose livelihood depends on full-time job production prefer Caterpillar* Diesel Engines by a country mile.

Whether it's to power a crusher, asphalt batcher, shovel, dredge or other vital machinery, there is a modern Cat Diesel Engine to fit your exact requirements. The fine-tolerance workmanship and superior metals which go into these engines will give you dependable performance, minimum down time and low operating cost.

If you have power problems, get the expert advice of your Caterpillar Dealer Installation Engineer. He can show the right fit of power for any job.

Cat Engines by the thousands have proved their ruggedness and total cost economy. Maurice Gredvic, owner of the Riverside Sand and Gravel Co., said of the D397 powering his crusher: "We have excellent service from our Cat Engine—haven't

Cat D397 Electric Set powers this 4-unit Cedarapids & Symons portable crusher plant 100% (below). The Riverside Sand & Gravel Co. operation shown is producing gravel for surfacing 14 miles of state highway from Alfalfa to Mabton, Wash.



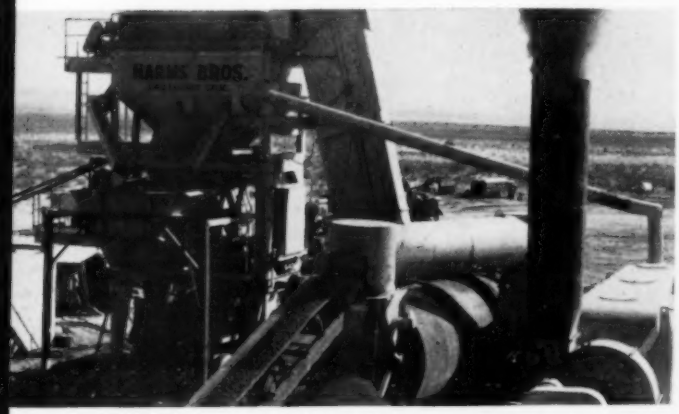
ENGINE POWER BY CATERPILLAR

had any down time, haven't had any overhaul." William Tregembo, plant superintendent of Harms Bros., says: "This company has always been in favor of Caterpillar equipment because of stability and dependability. In the long haul and day-after-day running, you don't beat Caterpillar products for long life and minimum down time!"

If down time might kill you this season because of a sick engine, pick up the phone today and ask your nearby Caterpillar Dealer Installation Engineer for profitable advice on powering or repowering.

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U. S. A.

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



Powering this asphalt batch plant (above) is a D397, chosen for rugged dependability. Harms Bros., general contractor, resurfaced 27 miles on Highway U. S. 466. Capacity of batch plant 5,000 lbs. per batch — did as high as 200 tons per hour.

Feeding hopper for Ellefson Bros. rock and gravel crusher (above) is Koehring shovel powered by rugged D318. Job site northeast of Gays Mills, Wisconsin. Says E. S. Ellefson: "We've used Cat stuff since '45, for their long life and dependable service."

One of two lighting towers powered by Caterpillar D311 Diesel Electric Sets for night lighting operations on Coralville Dam near Iowa City. Towers carry eighteen 1,000-watt lights, and Cat Electric Sets are relied on for their proven dependability.

Cylinder liners typical of quality in Cat Engines

Full-length replaceable wet-type liners carry the heat away from critical wear areas — give longer life to pistons and rings. With a tensile strength of 70,000 psi, these liners are typical of superior Cat workmanship and material going into each engine component.

Dept. P&Q-1, Engine Division
CATERPILLAR TRACTOR CO., Peoria, Illinois, U. S. A.
Send me more information about Caterpillar Diesel Engines for prime and repowering use. I have checked the proper box to guide your selection of material.

☐ I would like detailed information, as I may be in the market for a Cat Diesel Engine or Electric Set. I understand that I am under no obligation.
☐ I am interested in learning more about these engines.

Name _____

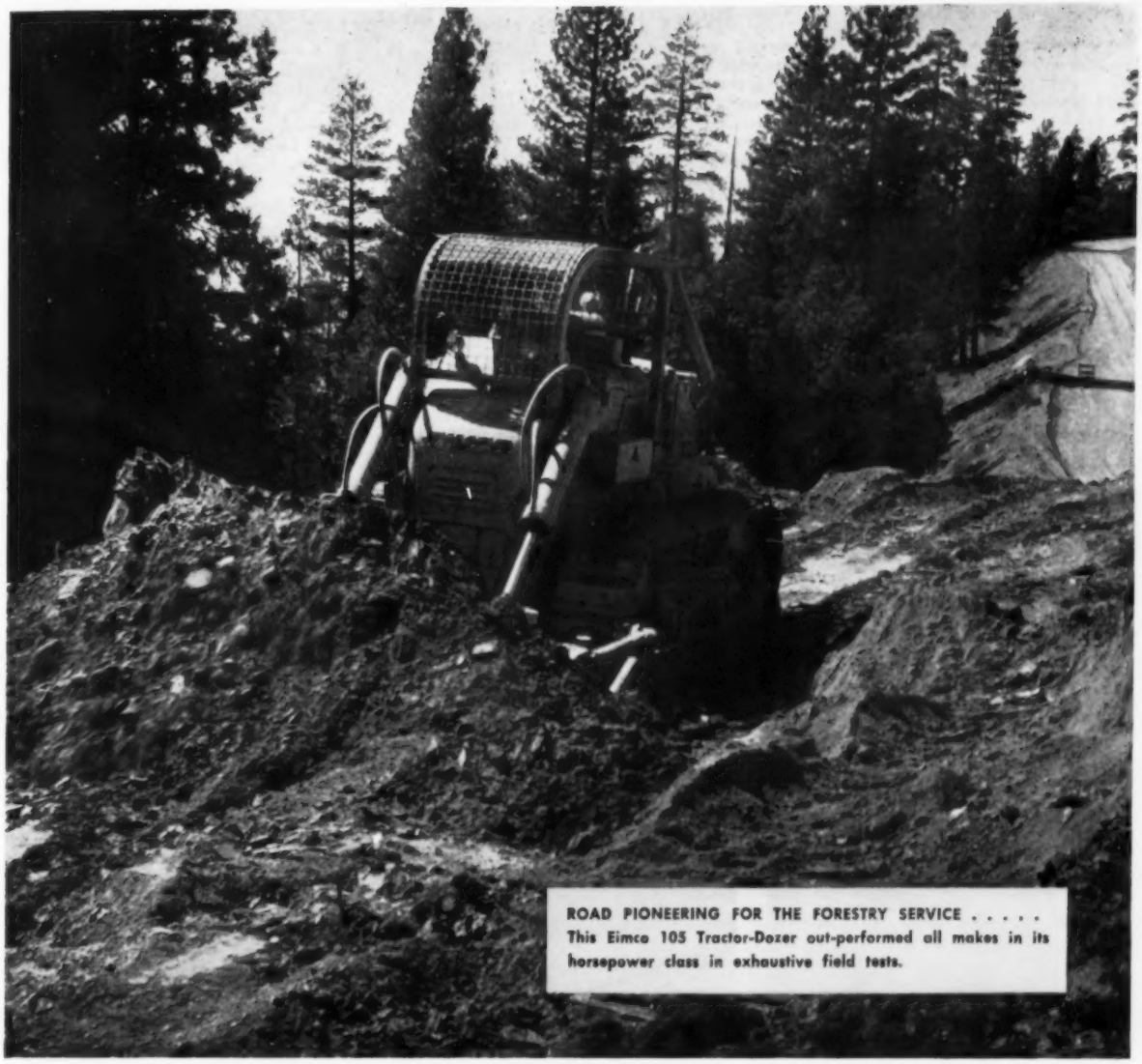
Company _____

Address _____

City _____ *Zone* ____ *State* _____

Enter 173 on card, page 167

EXHIBITOR	PRODUCTS SHOWN	BOOTH	EXHIBIT PERSONNEL
Cook Bros. Equipment Co.	Late model truck mixers. New concrete finishing trowels	29	C. W. Tilden, W. L. Walsh
Crane Carrier Corp.	Photo display, literature	70	
Cummins Engine Co., Inc.	Diesel engines—75 to 600 hp. Torque converters	5	J. D. Gatten
Diamond Iron Works Div. Goodman Mfg. Co.	Wire rope suspended belt conveyor	20	C. E. Hanson, D. R. Freeberg, O. Olson, J. Hart, G. McCorison, J. Harrigan
Dodge Division Chrysler Corp.		47	
Eagle Iron Works	Full-scale unit new processing equipment, working model heavy-media separatory vessel; literature on classifiers and dredging ladders	25	T. Aulmann, R. Aulmann, C. B. Laird, H. White, J. Twyman, J. McFarland, S. Ford, C. B. Cochran
Erie Strayer Co.	Latest truck mixer plant, road batching equipment, clamshells	39	R. L. Strayer, C. J. Polinek, W. R. Miller, A. Brennet, W. S. Hawkins, H. C. Riley, J. P. Godfrey
Euclid Division General Motors Corp.	Twin type crawler tractor	2	R. Keidel, R. Rogers
Fleet Sales Department Ford Div., Ford Motor Co.	Late model trucks up to 277 hp.; literature on new designs	66 67	H. W. Cook, A. C. Scott, J. A. Taylor, R. W. Wanton, R. Sandberg, D. Lee, R. Latimer
Flexible Steel Lacing Co.	Belt fasteners, lacing, repair materials	37	F. Benson, E. Asbridge, D. Beach, L. Coleman, R. Beach, S. Kuehl, J. Ramsey
Ford Motor Co. Tractor and Implement Div.		65	
The Four Wheel Drive Auto Co.	New heavy-duty 4-wheel drive trucks with mixers mounted	3	G. F. DeCoursin, J. A. Wreissen, L. Pernot, A. Laack, R. Peterson, F. Brown, J. Horton, A. Sturwold, R. Barker, A. Brehmer
GMC Truck and Coach Div. General Motors Corp.	Photo display, literature	22	
Heltzel Steel Form & Iron Co.	New type portable concrete batching plant, batching equipment, bins	41	C. J. Heltzel, R. E. Heltzel, H. C. Wetzel, R. C. Perrett
Hercules Galion Products, Inc.	New truck mixer model with front engine power take-off. Also featuring new automatic automotive type drive	44	B. Bohmer, D. J. Redmond, H. Boncutter
Hercules Motors Corp.	New model 3, 4, 6-cylinder diesel power units; 2 and 4-cylinder industrial engines	21	W. L. Pringle, L. G. Downey, W. L. Brough, F. H. Geisler, T. S. Klinedinst, W. Humphrey, R. Bow, W. Robinson
Instant Moisture Control Div. Colorado Premix Concrete	Photo display, literature	60	
International Harvester Co.	Construction division: new model haulage truck. Motor truck division: heavy-duty 6-wheel truck mounting transit mixer	43	R. G. Greer, C. E. Jones, J. C. Cranston, W. S. Hall, R. C. Burns, W. E. Greene
The Jaeger Machine Co.	1958 models 6- and 7-cu. yd. truck mixers, submersible sump pumps	40	E. L. Baugh, et al.
The Jeffrey Mfg. Co.	Display heavy-duty sand and gravel jig, literature	53	B. Bird, L. Pugliese
The C. S. Johnson Co.	New transit-mix batching plant	30	E. J. Goes, J. E. Chadwick, A. Cossens, E. B. Hill, P. H. Kearns, R. Russell, J. Shapland, C. Blair, G. C. Lindsay
Koehring Division Koehring Co.	Off-the-road instant dump haulage unit, 1-cu. yd. shovel	30	
Link-Belt Company	Late design screens, conveyors, material handling equipment; power transmission components	8	
Link-Belt Speeder Corp.	Shovel, dragline machinery components; operating model hydraulic control system	9	
Littleford Bros., Inc.	Photo display, literature	63	
Mack Trucks, Inc.	Photo display, literature	27	
Manitowoc Engineering Corp.	Photo display, literature	58	E. N. Fors, J. T. Kaminski, H. B. Halloran, M. R. Stumm
Meckum Engineering Corp.	Dredge and materials-handling pump of new design, action model of sand and gravel jig	14	J. W. Meckenstock, C. R. Gnuske, M. Hill, R. Nestor, L. Stogentin, H. Troup
Monarch Road Machinery Co.	Working models of complete line of hydraulic controls for ready-mix truck chutes	13	E. W. Jackoboice, G. A. Jackoboice, W. P. Ferris, J. Barwacz
Morris Machine Works	Slurry and dredge pumps and components, literature, photo display, technical data	28	W. M. Mercer, R. Doty, W. H. Pfarrer
Murphy Diesel	Mechanical-electrical power units, photo display	15	P. Schnetzky
National Conveyor & Supply Co.	Photo display, literature	19	
Noble Company	Full size and scale model portable and stationary batching plants, literature	31	N. I. Searls, R. C. Clark, L. D. Taylor, A. B. Kinley, F. K. Quinn, R. L. Baxter, A. P. Jensen, E. W. Peck Jr., H. Leroy, R. S. Carlson
Oshkosh Motor Truck, Inc.	6-wheel drive concrete carrier	1	O. B. Zimmerman, A. Marker, L. Miller
The Owen Bucket Co.	Photo display, literature	61	
Plant City Welding & Tank	Complete line of steel forms, including double T, piling, and special units	17, 18	C. E. Hardee, H. O. Whitehurst, E. E. Schutz, L. S. Bessant
Reo Division White Motor Co.	1958 tandem model truck specifically designed for ready-mix concrete operation	4	J. Tooker, J. Adams, J. Joyce, W. Blaul, S. Pacelli
Rockwell Spring & Axle Co. Timken Detroit Axle Div.	Photo display, literature	69	



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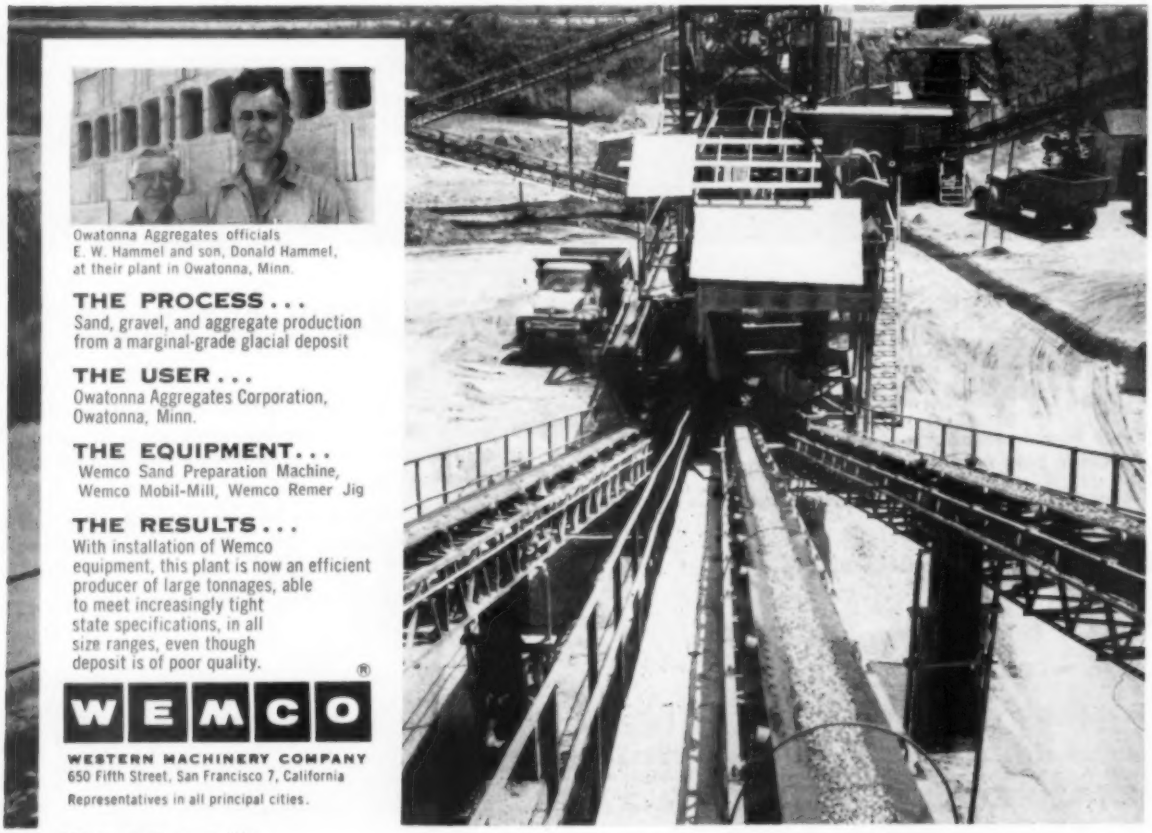
B-301

EXHIBITOR	PRODUCTS SHOWN	BOOTH	EXHIBIT PERSONNEL
Servicised Products Corp.	Concrete specialty products, including premolded expansion joint fillers, joint sealing compounds, waterstops	56	R. S. Porter, L. S. Lay, N. J. Hoeh, J. A. Thill, T. D. Stanley, S. H. Brown, W. J. Elliott, J. E. Poole
Sika Chemical Corp.	Concrete specialty products (accelerators, densifiers, etc.), panel samples, job photos, literature	62	Dr. E. Schmid, R. A. Jessen, T. Van Dormolen, R. I. Geyer, W. T. Young, F. S. Long
The T. L. Smith Co.	Front power take-off truck mixers, new turbine type mixers	51, 52, 68	R. W. Smith, W. A. Clayton, R. P. Bremner, R. R. Bains, O. E. Scott, J. R. Heinrich, G. A. Whitman, M. V. Hendrickson, B. F. Durham, L. E. Broberg, T. K. Stromstead
Solvay Process Div. Allied Chemical & Dye Corp.	Photo display, literature on calcium chloride and applications	54	R. Lovatt
Syntron Company	Working models of vibrating feeders, grizzlies, screens, conveyors, elevators in a closed circuit system. Drills bin vibrators, controls	7	
Tractomotive Corp.	Front-end wheel loader with single-lever power shift and directional control	49	
The Travel Batcher Co.	Photo display, literature	34	
Western Machinery Co.	Full operating size sand and gravel jig, sand preparation machine, movies on theory and operation of HMS equipment; new solids pump, sand cyclone	45	W. F. Haddon
Westinghouse Transit Mixer Div. LeTourneau-Westinghouse Co.	Transit mixer with new truck engine drive	10	C. I. Bohmer, F. Bardash, R. Burtnett, W. White, P. Turaska, L. Boyce
The White Motor Co.	Six-wheel truck with front-mounted power take-off; photographs, literature	32	J. N. Bauman, P. E. Tobin, H. R. Stickel, R. L. Weider, E. H. Gustafson, L. B. Gilbert, K. A. Roesch, H. L. White
Whiteman Manufacturing Co.	Truck mixer with new type take-off drive; new walking type power buggy, electric and gas driven vibrators	12	G. A. Teasdale
Gar Wood Industries, Inc.	Excavator, dump body, hoist (heavy-duty)	6	M. G. Peck, D. J. Davis, R. Miller
Worthington Corporation	Truck-mixers (6-cu. yd.) with separate engine drive or right angle drive, cut-off tank or standard flush tank, transmission cut-a-way	35	K. W. Horsman, P. J. Foley, V. H. Berg, G. Ross, L. V. Gilroy, W. L. Gaya, H. F. Broom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E. W. Hammel and son, Donald Hammel,
at their plant in Owatonna, Minn.
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from a marginal-grade glacial deposit
THE USER...
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Wemco Sand Preparation Machine,
Wemco Mobil-Mill, Wemco Remer Jig
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N.S.G.A.-N.R.M.C.A. Program (*From page* 170)

"Economic Factors Involved in Anniversary Wage Increases or Application of the Cost-of-Living Index"—Ewan Clague, Commissioner of Labor Statistics, Washington, D. C.

"The McClellan Investigation"—Vincent P. Ahearn, executive secretary.

FRIDAY MORNING JOINT SESSION*

Presiding officer—E. J. Nunan

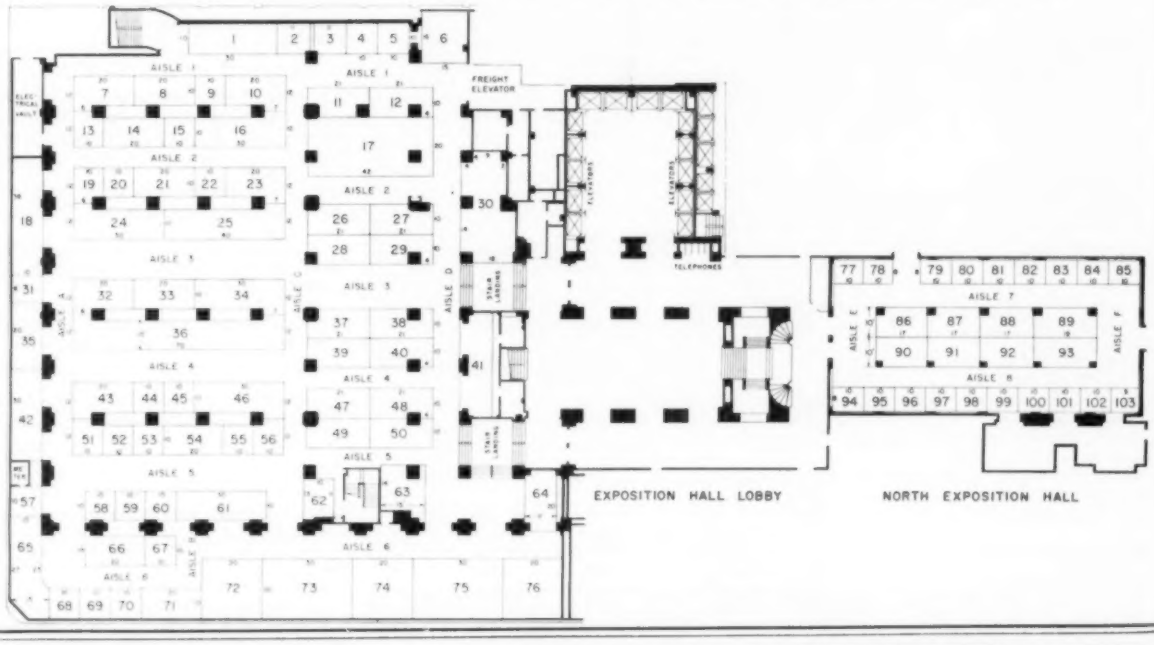
"A Review of Some Specification Problems Affecting Sand and Gravel and Ready Mixed Concrete"—Stanton Walker.

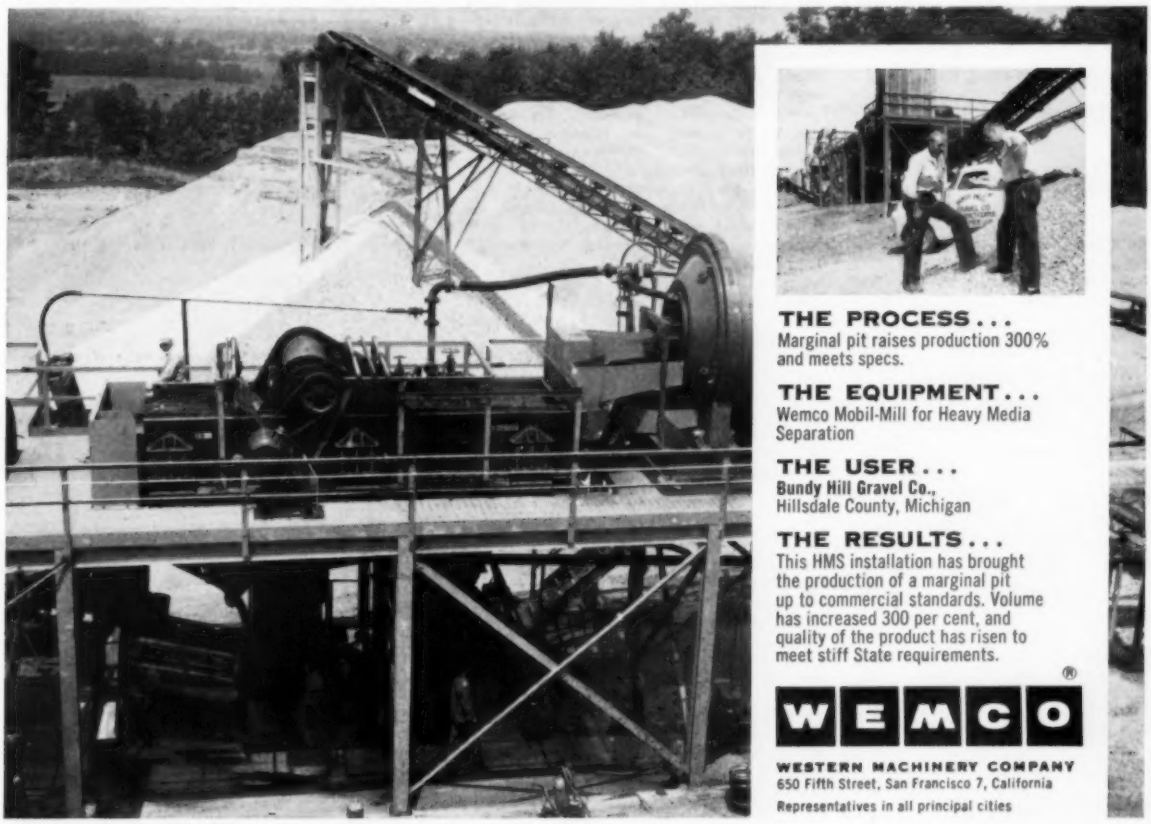
"Laboratory Studies in the Evaluation of Aggregates"—(By Delmar L. Bloem and R. D. Gaynor) Delmar Bloem.

"Studies of Flexural Strength of Concrete"—(By Delmar L. Bloem and Richard D. Gaynor) R. D. Gaynor.

"The Fire Resistance of Concrete as Affected by Aggregates"—(Author to be selected.)

COMBINED BIENNIAL SHOW – CONRAD HILTON, FEBRUARY 10-13, 1958





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Wemco Mobil-Mill for Heavy Media Separation

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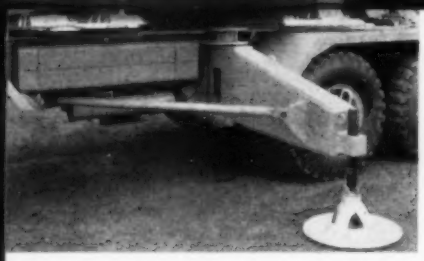
Exhibits at Conrad Hilton Hotel
N.S.G.A. and N.R.M.C.A. Equipment Show

EXHIBITOR	PRODUCTS SHOWN	BOOTH	EXHIBIT PERSONNEL
American Manganese Steel Div. American Brake Shoe Co.	Dredge and pump components including cutter head, ladder head assembly, suction nozzle, pump, nipples, elbows, etc.	17	N. M. McGuire, D. G. Sherwood, W. W. Gray, J. S. Carr, W. R. Sims, W. M. Beggs, D. G. Manning
American Steel & Wire Co. U. S. Steel Corp.	Photo display, samples of wire rope applications in pit and quarry operations	37	H. Price, et al.
Autolene Lubricants Co.	Photo display, literature	71	
Baldwin-Lima-Hamilton Corp.	Photo display illustrating equipment relative to sand and gravel operation	41	S. Kreher, J. W. Hardesty, P. R. Ehrgott, R. K. Wills, M. Pierce, J. Watson, A. Bellows, J. W. Artz, P. Hawkinberry, H. Hesse, J. Rentz, J. McPheron
Bucyrus-Erie Co.	Operating model of 6-cu. yd. shovel	74	R. C. Adams
Burkhart Engineering Associates, Inc.	Oil-fired boiler, complete with all controls, set up as in a ready-mix operation	5	L. Polisner, H. G. Rapley, R. Rapley, D. Rapley
C & W Sales Co., Inc.	Photo display, literature	54	
Calcium Chloride Institute	Display model of dispenser for adding uniform amounts of calcium chloride to ready-mix, concrete products; technical consultation service	4	G. H. Kimber, W. E. Dickinson, K. M. Saville, H. B. Aikin, G. K. Owen, H. A. Smith, W. F. Reynolds
Chicago Fly Ash Co. jointly with: Detroit Edison Co. McNeil Bros., Inc. Walter N. Handy Co.	Literature, photographs, technical data	45	C. E. Lovewell, E. J. Hyland, C. J. Cain, J. Wilde, T. V. Woodford, R. McNeil
Cleaver-Brooks Co.	Late model self-contained boiler	76	O. E. Jacobsen, W. Schuman
Concrete Construction Magazine	Trade magazine	31	
Concrete Controls Corp.	Literature, photo display	19	
Concrete Publishing Corp.	Trade magazine	69	
Contractors & Engineers	Trade magazine	63	
Cross Engineering Co.	Perforated steel screens including new turned, integral edge preparation	15	S. H. Fulkerson, R. G. Johnston, D. C. Coleman
Frank D. Davis Co.	Slabs of integrally-colored concrete, display samples of commonly used colors including ready-mix color cards; bulletins, photo display	20	F. D. Davis, H. C. Crawford Jr., P. Raber
Deister Machine Co.	Double-deck, 4- by 10-ft. vibrating screen (in operation); literature, technical data	48	I. F. Deister, E. Deister Jr., I. F. Deister Jr.
Dewey and Almy Chemical Co.	New water reducing agent, recently introduced to concrete industries; air-entraining agent	64	W. M. Rand Jr., W. Adler, M. E. Prior, R. G. Crimm, S. D. Burks, D. S. Nash
Dodge Manufacturing Co.	Speed reducers, drives, couplings, bearings; technical data, literature	61	L. J. Cashman, J. Muir, A. L. McKay, C. Leide, L. Haines, H. Johnson
Edick Laboratories, Inc.	New remote-control automatically re-setting water meter; new ready-mix truck maintenance solvent, air-entraining agent, new masonry cleaner	59	J. Hinkamp, L. Sheggrud, L. Sloan, P. Van Schaik
Engineered Equipment	Photo display featuring automation for ready-mix, concrete products plants, in bin and batching equipment	47	T. Loveall, L. Parker, S. Bender
The Fairfield Engineering Co.	Conveyors of various types; cut-away of troughing idlers; literature	58	J. Halperin, J. McCombs
Food Machinery & Chemical Corp.	All-steel casting forms for prestressed concrete including new turned-up edge double T forms and P.C.I.-A.A.S.H.O. approved bridge beam forms	9	E. L. Cole
Forrer's Div. of Spray-O-Bond Co.	Moisture probe, block machine water control system, graphic batching control panel, automatic calcium chloride dispenser, air-entraining agents, plasticizers, accelerators	70	R. F. Forrer, E. A. Netzband, R. Cahill, J. Davies, F. Forrer
Gatke Corporation	Frictions, brake blocks and liners, molded fabric bearings, bushings; literature	21	W. R. Berngen, F. T. Gatke, N. Radloff, J. A. Younglove, W. E. Gebhardt, J. J. Zelek, R. Randolph
General Electric Co. Mining and Metal Sales Development Unit	Photo display, literature, technical data	57	
Gilson Screen Co.	New optional testing screen accessories including hydraulic clamp, door enclosure, sample splitter, tray racks; testing screen and sand attachment for handling 8-in. round sieves	7	
Gruendler Crusher & Pulverizer Co.	Photo display, literature	35	
George Haiss Mfg. Co., Inc. Div. of Pettibone-Mulliken	See Universal Engineering Corp.	73	
Hardy Scales Co.	Technical data, photo display	72	
Harnischfeger Corp.	New model d.-c. welders and electrodes, material-handling hoists; films, photo display of equipment applications in sand, gravel, quarry operations	27	B. W. Thorpe, et al.
HarriSteel Products Co.	Photo display, literature	13	



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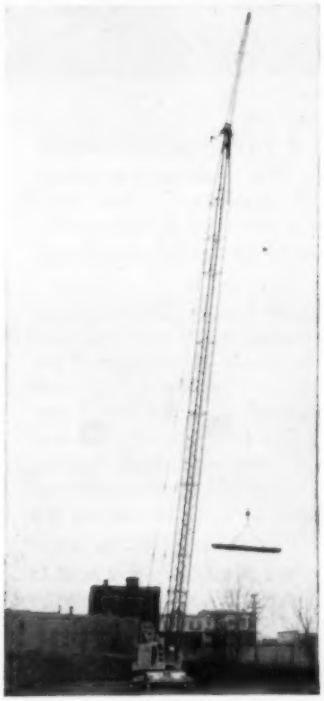

ALL NEW . . . from exclusive swinging outriggers to the longest, strongest boom in its class . . . it's the American 500 Series Truck Crane. Revolutionary new features put this heavy duty 40-ton capacity crane far ahead in on-the-job versatility, performance and operating efficiency.

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Mechanically, you'll find that the 500 Series offers such important advantages as specially designed graduated air controls that give positive clutch control from smooth, easy engagement to full pressure with finger tip effort . . . liberal use of anti-friction bearings—in swing rollers as well as deck machinery . . . individually removable shaft assemblies . . . new design machinery base featuring straight-through girders and integrally welded roller supports that offer maximum strength, minimum weight and accurate roller alignment . . . engine controlled load lowering . . . engine controlled boom lowering . . . retractable high gantry . . . plus countless other job-tested features that cut operating costs, boost efficiency and keep your jobs on schedule month after month. Your American Distributor will bring you detailed information, all the facts on this important addition to the big American Excavator and Crane line that offers capacities starting at ½-yard, 12½ tons and up!

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This dependable line of heavy machinery has long been recognized throughout the cement, aggregate and construction industries for maximum, continuous production of big tonnages at lowest possible cost . . . including Symons® Gyratory and Cone Crushers for primary and fine reduction crushing; Symons Vibrating Grizzlies and Screens for scalping and sizing; Grinding Mills for wet and dry grinding; Kilns and Coolers; and a complete line of Nordberg Engines from 10 to over 12,000 horsepower to meet practically all power requirements.

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Q156-R

Typical of today's modern highway construction is this view of the new Freeway in Oakland, Calif., showing 3 levels of highway structure over 2 levels of railroad.

(Photo courtesy California Division of Highways)

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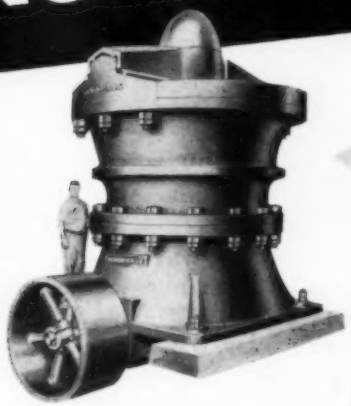

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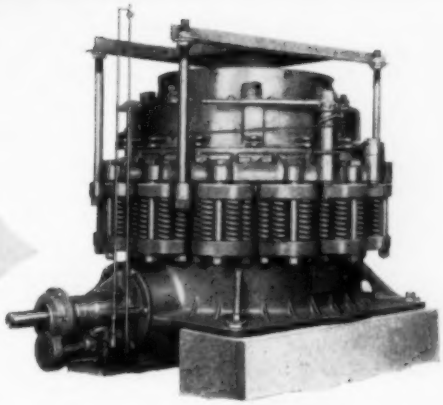

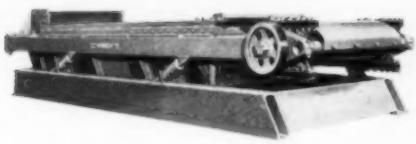

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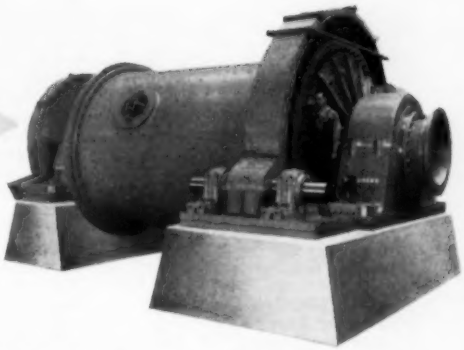

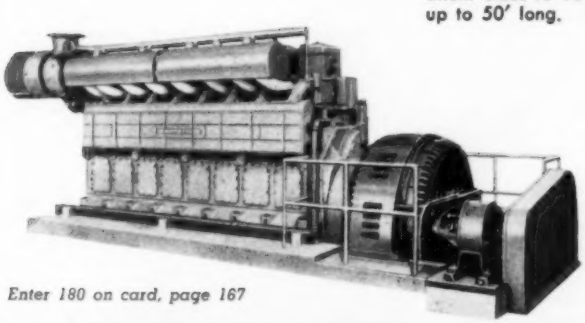

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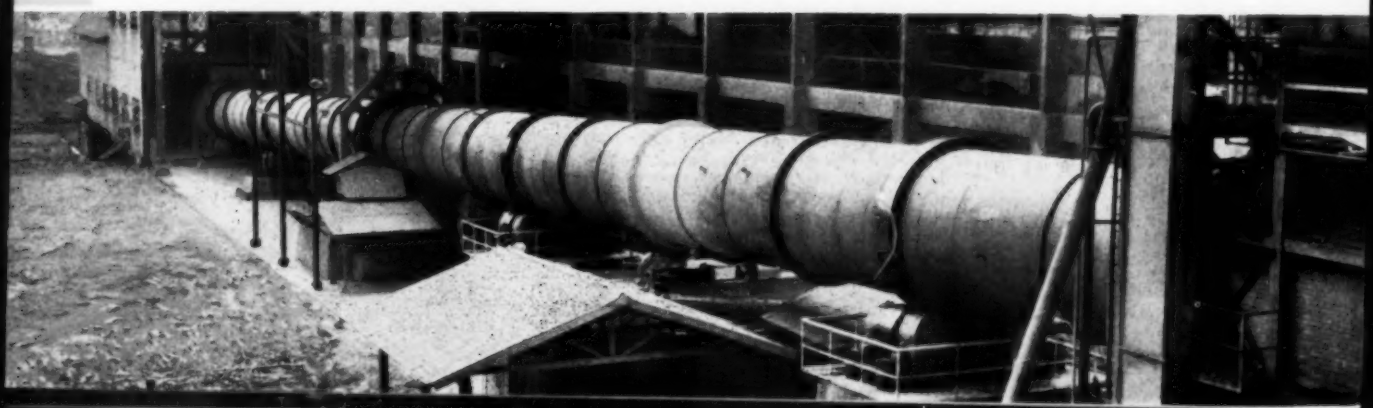

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EXHIBITOR	PRODUCTS SHOWN	BOOTH	EXHIBIT PERSONNEL
Hendrick Manufacturing Co.	Samples various types and sizes perforated screens by type and size of perforation; open floor grating, wedge slot and wedge wire screening	38	J. J. Risko, Dr. D. Blackburn, B. G. Dann, Jr., A. C. Baker, W. F. Kendrick, L. C. Cooley
Hewitt-Robins, Inc.	Late model vibrating feeders, screens, conveyor section and components, speed reducer, electronic level indicator	36	W. B. Hicks
Howe Scale Co.	New batching and aggregate proportioning equipment including plug board control attachment; new point type strip chart recorder	52	J. S. Blackwell, D. S. Erickson, T. P. Cosgrove
Iowa Manufacturing Co.	Individual units of processing equipment including vibrating screen, impact breaker, twin jaw crusher; bulletins on new units including stabilized base pugmill, portable secondary and tandem crushing plants; photo display	75	A. C. Gossard, et al.
Kensington Steel Co.	Manganese steel casting repair components for shovel and crusher equipment; tractor rails, grousers, sprocket rims	28	E. A. Lerner, et al.
Ludlow-Saylor Wire Cloth Co.	Samples of square and long opening woven wire aggregate screens; includes abrasion, vibration and fatigue resistant units; operating model of vibrating screen section with fine mesh supported by coarse mesh backing screen	62	J. F. Steffens, H. W. Betzold, M. F. Erbe
Manganese Steel Forge Co.	Woven screens, perforated plate, pins and bushings, skirt boards, wear plates, weldments; new catalogs on screens and fabricated items	49	H. C. Doepken, I. W. Benson, O. Busenius, L. R. Cartwright, J. Cecil Jr., J. Fiori, R. D. Graham, E. F. Hannum, R. M. Hannum, V. Leet, R. F. Morehead, R. M. Murdock Jr., W. H. Potter, W. Shoemaker, J. J. Swenson, J. A. Webb
E. F. Marsh Engineering Co.	Photo display, literature	8	
The Master Builders Co.	Photo presentation of applications of air entraining admixture for concrete on world-wide construction projects	25	F. R. Hinds, G. B. Southworth, D. E. Bradley, C. F. Brown, J. R. Florey, A. S. Holway, R. G. King, W. G. Sanders, P. L. Tasio, P. W. Zhun
McLanahan & Stone Corp.	Models of screw and log washers; backdrop illustration of full line of pit and quarry equipment, particularly washers, crushers, feeders	50	J. C. McLanahan, R. Fye, R. Brown, R. Rumbaugh
W. R. Meadows, Inc.	Photo display, literature	66	
Motorola, Inc. Communications and Industrial Electronics Div.	New line of mobile two-way radio units, featuring transistorized power supplies for both receiver and transmitter	43	
Nagle Pumps, Inc.	Different types in new line of small size centrifugal pumps; including material-handling, abrasive handling, and liquid handling units, also vertical, cantilever shaft pump	11	P. Nagle, C. L. Edwards, E. E. Scogin, J. Thomas, C. A. Nordstrom, C. H. Eulass
Nordberg Manufacturing Co.	Operating models (¼ scale) of cone crusher, rock deck screen, rod and bar grizzlies, and recent designs of other screening units; film on crushing equipment applications; technical aid	18	D. A. Cheyette, J. B. Bond, H. N. Propp, J. W. Crandall, J. D. Grace, R. E. Schulz, L. F. Thompson, et al.
Northwest Engineering Co.	Photo display of excavator operations; literature, technical data on late models	16	R. W. Cornelison, E. R. Windahl, G. Williams, B. H. McIntosh, et al.
Pettibone Mulliken Corp.	See Universal Engineering Corp.	73	
Pick Manufacturing Co.	Photo display, literature	68	
Pioneer Engineering Div. of Poor & Company	Unit from new line of portable duplex crushing and screening plants; operating model (¼ scale) of complete crushing, screening, and sizing plant	30	C. R. Rolf, A. J. Belanger, C. G. Sears, F. W. Hartlage, W. A. Rundquist, F. McGie
Pit and Quarry	Trade magazine	56	
Productive Equipment Corp.	Late model double-deck 4- by 12-ft. vibrating screen with deep side sheets	14	G. W. Dwyer, L. H. Lehman, L. M. Haluch, L. C. Crismore
Radio Corporation of America	Latest line of 2-way radio equipment; descriptive literature on new units, including combination microphone-control-speaker, selective channel tuner, pocket size receiver for personal reception	6	R. C. Dubois, H. G. Boyle, D. O. Reinert, J. R. Mann, L. J. Shidaker, V. J. Bauer, P. W. Morrell
Richmond Screw Anchor Co., Inc.	Form panel accessories, literature	67	R. Spellman, A. Watt Jr.
Riverside Manufacturing Co.	Industrial uniforms for drivers and plant personnel in a complete range of colors	44	E. B. Acuff, H. V. E. Platter Jr.
Rock Products	Trade magazine	51	
Sarasota Engineering Co., Inc.	Automatic water control for dry batch mixers primarily for concrete masonry production; water meter for determination of moisture content in fine aggregate	3	R. E. Wilcox, et al.
Sauerman Bros. Inc.	Slackline cableway hoist model, 3-cu. yd. drag scraper, wire rope blocks; photo display of equipment applications	23	J. R. Dillon, W. R. Ellertson, J. H. Guilford, E. W. Lieb, A. T. Marchuk, R. A. Deane, A. W. Lambert, M. O Martin
Screen Equipment Co.	Late model 4-bearing 3- by 8-ft. double-deck screen; new design 3- by 10-ft. 2-bearing screen (triple deck)	1	N. J. Gleiser, C. S. Fielding

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BRADLEY HERCULES MILLS

From rough to finish . . .
in one low-cost operation

Constant progress in design and manufacture over the past 50 years has made Bradley Hercules Mills the standard pulverizer where a superior agricultural limestone product is desired. Automatic electrical feed control eliminates manual operation. Rugged, dustless construction, maximum accessibility keep maintenance costs at an absolute minimum. In sizes to meet the requirements of most any plant at moderate cost.

For complete information, write for Catalog No. 61

Bradley PULVERIZER CO.

LONDON ALLENTOWN, PENNA. BOSTON

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SONIC TESTED • FIELD TESTED

"Cape Ann Alloy"* DROP BALL

*Forged and Heat Treated Alloy Steel. After three years of development "Cape Ann" offers a new FORGED Steel DROP BALL that outwears them all.

For further information write

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EXHIBITOR	PRODUCTS SHOWN	BOOTH	EXHIBIT PERSONNEL
Simplicity Engineering Co.	Vibrating feeder grizzly and double-deck screens	42	R. C. Johnson, J. C. Powlison, R. Gilbert, R. Jenkins, G. Judson, L. Lovett, R. Neall, J. Patterson, R. Taylor
SKF Industries, Inc.	Improved spherical roller bearing with new central lubrication feature; new triple-seal pillow block; complete line of bearings, including tapered roller and pillow blocks	40	
A. O. Smith Corp. Permaglas Div.	Late model glass-lined tank industrial water heaters; literature	2	D. Williams, D. V. Coon, L. Becker
Smith Engineering Works	Working models of crusher, scrubber, feeder, and fine sand recovery cyclone	26	D. Barnes, H. Schaper, et al.
Soiltest, Inc.	New design concrete briquette tester, portable concrete tester (200,000-lb. capacity), varied test apparatus for soils, asphalt, concrete	55	T. W. Van Zelst, E. E. Brush, J. R. Haverkos, W. R. Fuerst, G. E. Stanley
Southwestern Engineering Co.	Vibrating screen separator; demonstration and photo display on application to screening and classifying of industrial sand	60	A. A. Ficery, et al.
Stedman Foundry & Machine Co.	Two working models of single cage disintegrator, and 2-row cage disintegrator; bulletins on complete crushing, screening, mixing line of equipment	33	L. A. Rhodes, P. Perrine, W. E. Schaffnit, R. P. Holderbaum, W. Shoemaker, A. Mills
Stephens-Adamson Mfg. Co.	Belt conveyor components, feeder pans, bin level indicator, conveyor mounted piler for stock-piling from conveyor belts	32	W. E. Cousland, T. A. Ruddy
Symons Clamp & Mfg. Co.		22	
Taylor-Wharton Iron & Steel Co.	Photo display, literature	39	
The Thew Shovel Co.	New 1¾-cu. yd. rubber-tired front-end loader; photo of display shovel and crane units; working demonstrator unit of 2-leveler air power controls	46	M. B. Garber, G. E. Gunther, J. L. Beltz, W. H. Madden, F. J. Broad, R. T. Maynard, O. E. Reynolds, G. W. Glynn, J. D. Zook, R. W. Bairstow, F. A. Williamson, A. F. Clauss, C. S. Weber
Toledo Scale Co.	Complete demonstration of multiple scale concrete batching system, including remote console control cabinet, aggregate analyzer for determination of specific gravity, moisture content, and sieve analyses	24	F. D. Instone, G. H. Webb, F. W. Gilchrist, B. Van Savage, C. H. Cadwallader, F. L. Thomas, L. R. Hummel
The Torrington Co.	Extensive line of anti-friction bearings featuring a self-aligning spherical roller unit; also shown: cylindrical roller, tapered roller, ball, needle, and roller thrust bearings	29	R. U. Sautter, J. C. Heyvaert, J. A. Sarka, W. M. Walker, J. N. Wholean, R. E. Pardon, G. G. Whytlaw Jr., G. E. Marvel
The Transmission & Gear Co.	Photo display, literature	65	
The W. S. Tyler Co.	Latest design 4- by 10-ft. two-surface vibrating screen, testing sieve shaker, screen scale testing sieves, large selection of woven wire screens	34	W. W. King, J. H. Jackson, J. W. Sullivan, V. A. Kaufmann, H. F. Lawrence, C. E. Jenks
Union Wire Rope Corp.	Complete prestressing bed in miniature form, full line of slings and fittings; photo display, technical data, and literature	53	R. B. Boand, M. K. Hass, E. R. Blanchard, R. O. Kasten, R. G. Noble
Universal Engineering Corp.	Featured model of feeder-scalper; also models of impact breaker and primary crushing plant; literature and photo displays	73	H. J. Knudten, D. R. Conway, R. D. Conway, A. K. Holets, W. E. Hansen, E. Y. Jones, W. J. Burian, M. W. Preston, M. Miller
Werco Steel Co.	New model 3- by 4½-ft. impact crushers; crusher jaws and rolls, pulverizer components, perforated steel plate	10	T. E. Bridgewater, C. A. Adams, S. E. Bergman, D. B. Massey, K. J. Brennan, J. Konecci, H. Johnson, E. H. Jerabek, A. J. Arvia, G. A. Bland, K. Strosinski
Charles E. Wood Co.	Photo display, literature	12	

(Natl. Crushed Stone Assn. exhibits are listed on pp. 257-260)

Natl. Crushed Stone Assn. Convention Program

Conrad Hilton Hotel, Chicago, Ill., Feb. 17-19, 1958

MONDAY, FEBRUARY 17

Morning Session

Presiding—President Norman E. Kelb

9:30—"We'll Take the High Road"—Sound-color motion picture, courtesy of American Road Builders Association, Washington, D. C.

10:00—Greetings from the president—N. E. Kelb

10:15—Report of elections by the board of directors

10:30—Report of executive director—J. R. Boyd

11:00—"Threatened Road Blocks in the Highway Program"—Pyke Johnson, past-president, Automotive Safety Foundation, Washington, D. C.

11:30—"The Price of the Best is Always All the Rest"—Frank Lovejoy, former marketing and sales executive, Socony Mobil Oil Company, Inc., New York, New York

12:00—Adjournment

GREETING LUNCHEON—12:30 p.m.

Presentation of N.C.S.A. Safety Contest Awards—H. H. Kirwin, chairman, N.C.S.A. Accident Prevention Committee, treasurer, Eastern Rock Products, Inc., Utica, N. Y.

"Laughter vs. Slaughter"—Louie E. Throgmorton, vice-president and director of public relations, Republic National Life Insurance Company, Dallas, Tex.

Afternoon Session

2:30-5:30—Inspection of Manufacturers Division Exposition

6:30-11:00—N.C.S.A. Frolic

Dinner—Entertainment—Dancing

TUESDAY, FEBRUARY 18

Concurrent Morning Sessions

Operating Men and Equipment Manufacturers

Presiding—Montagu Hankin Jr., execu-

(*Continued on page* 260)

New Barber-Greene conveyor, erected in just 2½ days after the fire, boosts tonnage from 250 tons a day to 250 tons per hour.

Conveyor destroyed by fire on Monday
New one operating Friday

On Monday fire roared up a wooden conveyor owned and operated by a Milwaukee cement block company. Out of the devastation only the wooden "A" frames remained. Without the conveyor, production was at a standstill.

At 6:00 the following morning the owner called the local Barber-Greene distributor to see what could be done. Drawing from his own stock of standardized conveyor components—trusses, idlers, drives—the distributor was able to rush all the necessary components to the burned out plant by noon. And by Friday morning the new conveyor was erected and operating.

This fire and the quick return to normal operations point up the basic advantages of Barber-Greene *standardized* components. These advantages include: quick delivery from stocks of standardized components . . . elimination of engineering time required when building "custom-made" conveyors . . . and fast, easy erection.

Trouble-free operation is an additional benefit of the factory aligned and adjusted drives and terminals. Flexibility in shortening or lengthening your conveyor is another plus.

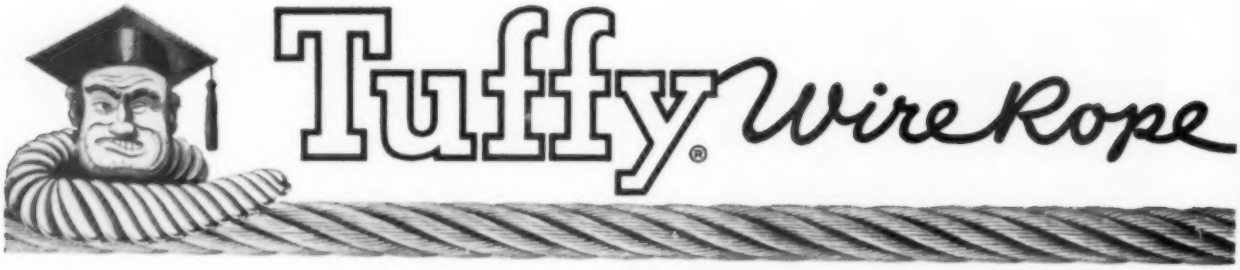
Write for information on Barber-Greene *Standardized* conveyor components

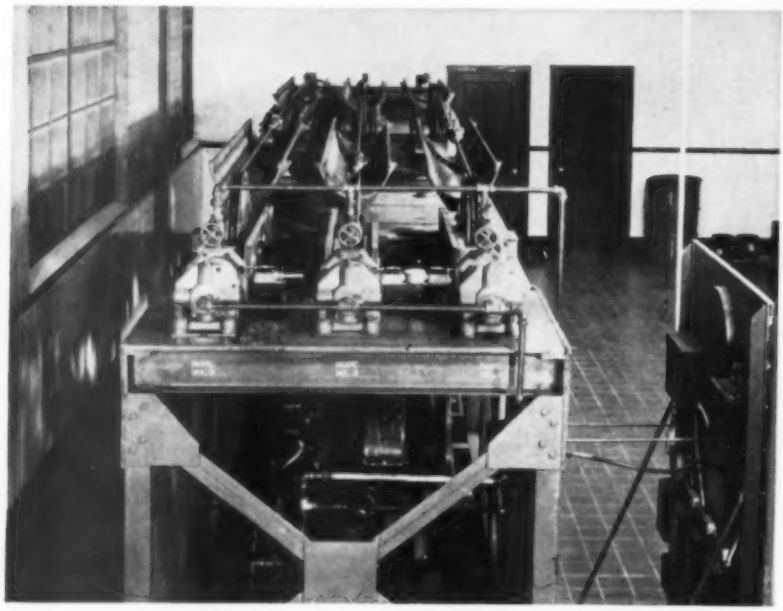
56-12-PE

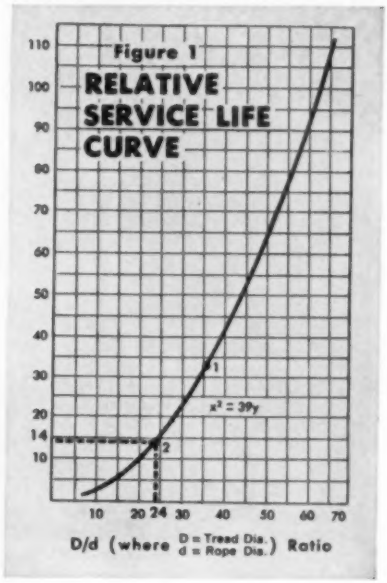
Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT







How Union Wire Rope Fatigue Tester Scientifically Predetermines Rope Life

How much service life can you expect from a given wire rope construction? Until recently there was very little factual data to answer that question. Predicting how long a certain wire rope would last under a given set of operating conditions was largely a matter of guesswork, trial-and-error and generally inexact calculations.

Knowing that bending stresses are a major factor in wire rope life, Union Wire Rope engineers designed the Accelerated Fatigue Tester, shown above, to pin down the effects of bending. Now, from a long series of bending tests, scientific data has been accumulated and organized to take the place of former rule-of-thumb methods.

"Preview" of Service Life You Can Expect

The data established by this laboratory research is based on the effects of various sheave diameters on bending stresses of various constructions of wire rope.

From test data, bending life curves have been plotted by Union Wire Rope Engineers for each of the more widely used rope constructions. Analysis of each of these curves showed them to follow a pattern expressed by the curve shown in Fig. 1 at right, above.

Note on Fig. 1 the curve shows that as the ratio of tread diameter to rope diameter increases (see D/d figures at bottom of chart) the longer the relative service life as expressed by the figures at the left of the chart.

However, there are few pieces of equipment on which sheave and drum sizes can be large enough to afford D/d ratios above 50. From test data the general-purpose range of D/d ratios was determined. Those recommended are set up in Table 3.

Spotted on the curve, for example, is the D/d ratio of 24 at point 2 and D/d ratio of 36 at point 1—these being the range for general purposes taken from Table 3 for the 6x25 filler rope. Moving from these points to the left on the chart, the relative service life of this rope ranges from 14 to 34 units of any service measure used, such as yards, tons, days, etc. 58-2

Table 2

BENDING-LIFE FACTORS

When Using Curve of 6x25 FW

CONSTRUCTION	FACTOR
6x7	0.57
18x7	0.67
6x17 Seale	0.73
6x19 Seale	0.80
6x21 Filler Wire	0.92
6x25 Filler Wire	1.00
6x31	1.00
8x19 Seale	1.14
6x37	1.33
8x19 Warrington	1.33
Tiller Rope	2.00

Table 3

SHEAVE DIAMETER FACTORS

ROPE CONSTRUCTION	GENERAL PURPOSE RANGE D/d Ratios	Where D = Tread Dia. d = Rope Dia.
6x7	63	42
18x7	54	36
6x17 Seale	49	33
6x19 Seale	45	30
6x21 Filler Wire	39	26
6x25 Filler Wire	36	24
6x31	33	22
8x19 Seale	31	21
6x37	27	18
8x19 Warrington	27	18
Tiller Rope	18	12

Enter 186 on card, page 167

Tips

Now to determine the relative service life of say a 6x37. Its bending life factor (see Table 2) is 1.33 as compared to 1.00 for the 6x25 filler wire. Multiply the service life readings of 14 and 25 for the 6x25 filler wire by 1.33, and we find the service life range of the 6x37 falls at 18 and 27 units of service. Relative service life of other ropes are determined in the same way by using the bending factor indicated for each as the multiplier.

Of course bending is not the only wear factor in wire rope operation. Hence the general rule—that more flexible ropes should be used as bending stress increases with decrease in diameter of sheave or drum—has to be modified in field use. Other principal operating conditions—in addition to bending stresses—that affect wire rope service life are loading conditions, portability, corrosion, abrasion, rope speeds, materials handled, and equipment design. You can get further information on all wear factors from your Union Wire Rope distributor or the Union Wire Rope Corporation engineering staff.

Ordering is ABC-Simple!

No complicated codes or long list of specifications. Just say "Tuffy", give type (Scraper Rope, Dozer Rope, etc.), length wanted and size. Just that easy!

Good Man to Know: Your Nearby Union Wire Rope Distributor

Whether your wire rope need is a scheduled replacement or a red-hot emergency, your Union Wire Rope distributor is ready with "right-now" service. He keeps varied stocks of Union standard constructions and the Tuffy Special Purpose Ropes. And he's backed by quick service from his nearby Union Wire Rope depot.

If it isn't rope you need, but advice on a wire rope problem, he's just as ready to help. If you don't know your Union Wire Rope distributor already, look under "Wire Ropes" or "Slings" in your telephone directory yellow pages.

Excessive strength can make a rope "muscle-bound"... Wire Rope must be

BALANCED

Buying wire rope on the basis of strength alone leaves other important properties out of consideration. Wire rope, like athletes, can be "muscle-bound" with too much strength.

Strength is not always the answer to the question of the proper rope to use. Strength does not increase flexibility, resistance to crushing, abrasive or fatigue-resistant qualities. Strength does not compensate for the core crushing which accompanies excessive loading.

The Tuffy ropes are engineered for each end-use of the different types of rope. The combination of strength, toughness and flexibility is different for each application. The way to be sure your rope is BALANCED for its job is to use Union Wire Rope. Get in touch with your Union distributor.

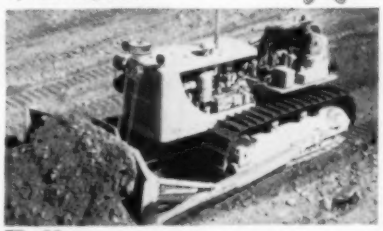
Tuffy Special Purpose Ropes: tailored and BALANCED for special uses

Tuffy BALANCED Slings & Hoist Lines

Top-performing team in every type of materials handling. Tuffy Slings are made of a patented, machine-braided fabric; stays extra flexible, can't be seriously hurt by knotting or kinking. Tuffy Hoist Line is a special construction of super flexibility and toughness.

Tuffy BALANCED Scraper Rope

It's flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Moves more yardage per foot because it's specially built and balanced to take the beating of drum-crushing abuse.



Tuffy BALANCED Dozer Rope

Built to give you longer service with less downtime. 150′ reels of 1/2″ or 9/16″ mounted on your dozers allow you to cut off worn sections without wasting good rope. Put Tuffy Dozer Rope on the job and watch costs go down!

Tuffy BALANCED Dragline Rope

Made to give you maximum abrasive resistance with super flexibility. Rides smoothly on grooves; hugs the drum when casting for full load. Consistently dependable in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.

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Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

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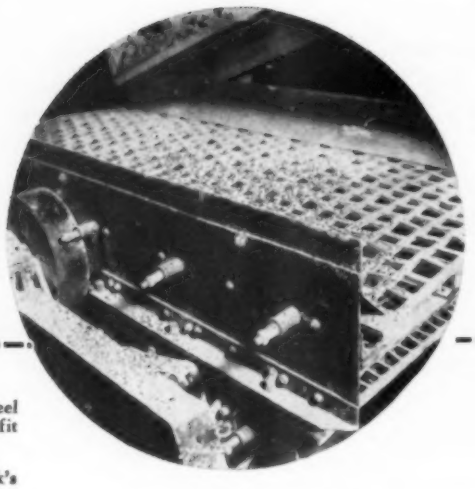

Here's how Hendrick H Quality Perforated Steel Plate can often mean the difference between profit and loss for your screening operations:

* Hendrick H Quality Steel comes from Hendrick's wide experience in selecting and specifying the best analysis of steel for the aggregates industry

* Hendrick H Quality Perforated Plate is available in high carbon steel, heat-treated after perforating for longer life

* Product uniformity is assured by uniformity of mesh throughout life of the screen

* Full clearance of Hendrick H Quality Plate practically eliminates blinding

* Faster deck changes . . . lower labor cost

* Large open area assures maximum protection

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All-welded, smooth, fast-cleaning

Light-weight, sturdy, Johnson wide-rehandling clamshells assure big payload performance in loose materials. Big-diameter sheaves, with sealed-in needle bearings, reduce friction loss, deliver full digging power to the cutting lips. Hard manganese cutting edge, welded to lips, toughens with use. Wide-rehandling clamshell is available in 10 sizes from ⅜ to 3 cu. yds. Other clamshells in Johnson line include general-purpose, and heavy-duty-digging types.

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Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" [illegible] thickness. *Write for Catalog Sheet.*

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DEPENDABLE FOR 60 YEARS

Woven Wire ALLOY SCREENS

TWIN CITY IRON & WIRE CO.
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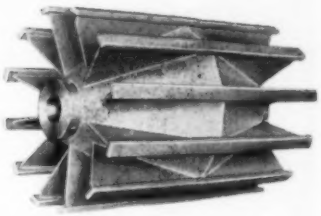
SAVE MONEY IN MATERIAL HANDLING with STANDARD EQUIPMENT

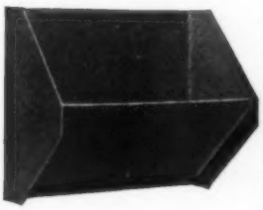
STANDARD WING-TYPE SELF-CLEANING PULLEY

- LOW COST
- LONGER LIFE
- GREATER STRENGTH WITH LESS WEIGHT



Reinforced all-steel welded construction of this Standard Pulley provides longer service, lower operating costs, greater efficiency. Built to deliver maximum service under severe operating conditions, the self-cleaning design combines far greater strength with less weight.

CONTINUOUS ELEVATOR BUCKET STYLE #2



This style of bucket is just one of several types of steel elevator buckets manufactured by Standard. All Standard Buckets are built to provide exceptional resistance to wear . . . to give longer service and lower costs. Available in Salem, Style "A," shelf type and other continuous style buckets for all types of operations.

STANDARD BIN GATE

Easy-to-operate, fast and efficient, this Standard gear-operated Bin Gate results in greater output in less time with lower labor costs. All-steel welded construction for longer life. Other styles of Standard Bin Gates also available.

SM2

To lower costs, specify Standard equipment for new installations or replacements. Write today for catalog showing the complete line of Standard products.

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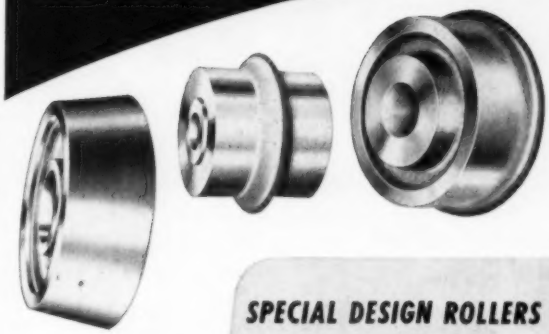

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DOUBLE FLANGE WHEELS
CRANE WHEELS
CONVEYOR ROLLERS
INDUSTRIAL CAR WHEELS

Extreme Resistance to

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BUCKETS • SPROCKETS • CHAIN • WHEELS • GEARS • SHEAVES • CABLE FITTINGS • BAR BENDERS, CUTTERS • R. R. CASTINGS • FIRE TOOLS, ETC.

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LEVER-TYPE JAW CRUSHER
STILL IN USE AFTER 36 YEARS
—at Keystone, So. Dakota

RELIANCE HEAVY-DUTY CRUSHER

- Heavier, stable—you save money on upkeep.
- Minimum abrasion — outlasts other designs 3 to 1.
- Long jaw plates — adjustable for fineness.
- Crushing, screening and washing plants—50 to 1,500 tons-per-day capacity—engineered to your needs.

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PERFORMANCE
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SPRAYING SYSTEMS
SPRAY
NOZZLES
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WRITE FOR Catalog 24... forty-eight pages with complete data on nozzle types, capacities and performance.
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THE NEW PORTLAND CEMENT PLANT MAP

The new Portland Cement Plant Map so many of you have been waiting for is now available and ready for distribution.

It is 34 inches high by 40 inches wide and printed on sturdy 60 pound stock, making it ideal for hanging on an office wall or placing under the glass top of your desk. Each producing plant is listed alphabetically, by state and city. This list covers the plants in the United States, Canada, Mexico, Cuba and Puerto Rico. These plants are also indicated on the geographical map. Also included in the information on each plant is the plant's producing capacity at the end of 1957, and its estimated capacity at the end of 1958, if the plant is planning to expand; the process used to manufacture each plant's cement . . . wet or dry; and the brand names of the cement each plant produces. New plants under construction and grinding plants also appear in this group.

In addition, portland cement distributing plants located in the United States, Canada, Mexico, Cuba and Puerto Rico appear in a separate list and are also shown on the geographical map.

These maps may be purchased for the following quantity prices:

NUMBER OF MAPS	PRICE
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11 — 25	.75 "
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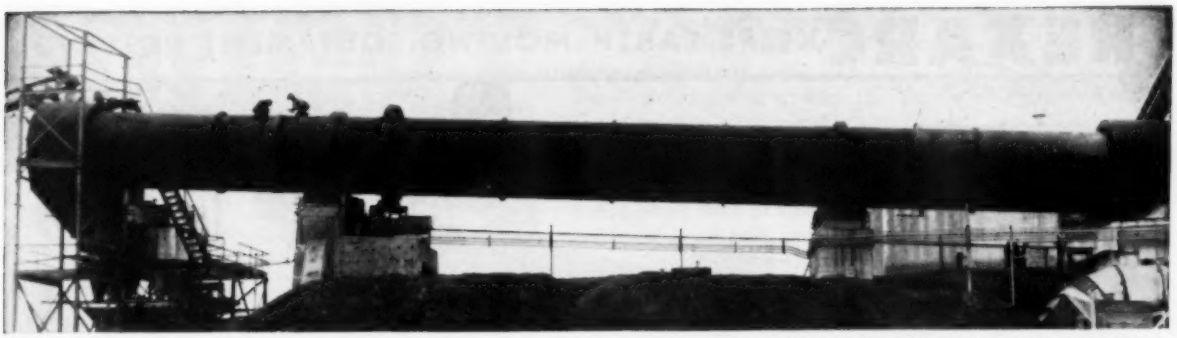

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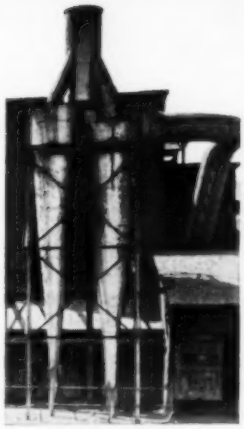
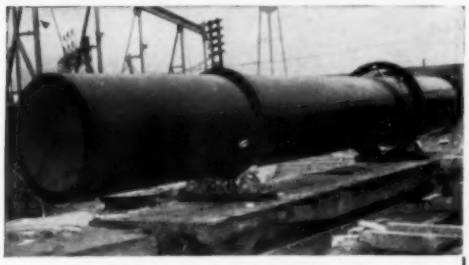
DUST COLLECTORS

Engineers & Contractors for Cement, Lime & Crushed Stone Plants



NEW HIGH EFFICIENCY DUST COLLECTOR



7'x60' CLAY DRYER INSTALLED IN HENDERSONVILLE, N. C.

W. P. HEINEKEN, INC.

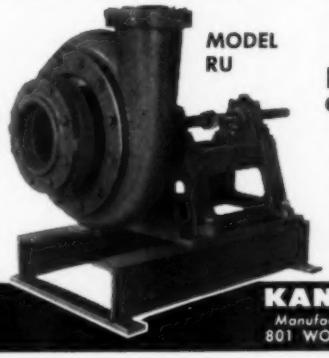
ENGINEERS MANUFACTURERS

50 BROAD STREET • NEW YORK 4, N. Y.

Enter 191-A on card, page 167

For Handling Abrasive, Fine Mesh Solids at Minimum Cost!

- NO PERIODIC ADJUSTMENTS
- ONLY THREE WEARING PARTS
- NON-CLOGGING IMPELLER
- STAINLESS STEEL SHAFT



MODEL RU

Lightning

RUBBER LINED PUMPS

OUTLAST METAL LININGS 5 TO 10 TIMES!

Ideal for handling silica sand, glass sand, coal silt, remnants from classifiers or any other abrasive slurry. The simple design of the pump and its long wearing construction assure long, trouble-free service life, high operating efficiency and a minimum of care. Available in 6" x 8" and 4" x 6" sizes.

A new bulletin completely describing this pump is available . . . write

KANSAS CITY HAY PRESS CO.

Manufacturers of Heavy-Duty Lightning Sand and Gravel Pumps

801 WOODSWETHER ROAD • KANSAS CITY, MISSOURI

Enter 191-B on card, page 167

HEXCELLENT SIZING PERFORMANCE

. . . insured by the job-tested Cross HEXCREEN

CROSS Hexcreens are standard sizing units in plants throughout the world.

CROSS HEXCREENS are one-piece, rigid sections; designed to provide LOW Installation Cost; MAXIMUM Strength; and unmatched Sizing EFFICIENCY.

Look for this stamp on all "CROSS" Products

C+

the Sign of PLUS QUALITY for PLUS PERFORMANCE

CROSS Perforated Steel Sections, Segments, Decks and Parts for

VIBRATING—SHAKING REVOLVING SCREENS

Services of Cross Field Engineer and Technical Data on Request.

CROSS ENGINEERING COMPANY

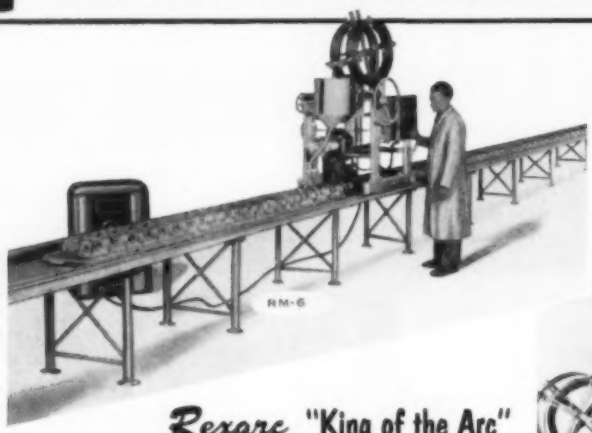
Manufacturers • Carbondale, Pennsylvania - Telephone: 300

"CROSS" SERVICE AGENCIES in Principal Cities

New York, N.Y. - 101 Park Ave. - MUrray Hill 5-0253

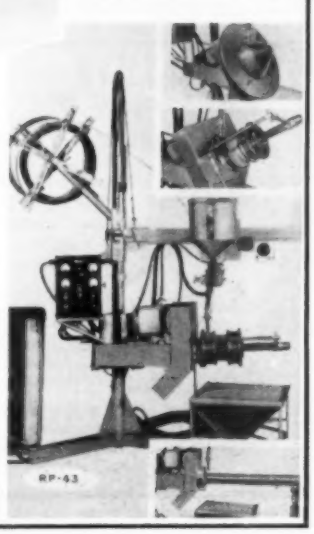
Enter 191-C on card, page 167

REXARC KEEPS EARTH-MOVING EQUIPMENT ROLLING!



BUILDUP AND HARD FACE THE NEW *Rexarc* AUTOMATIC WAY

Rexarc "King of the Arc"

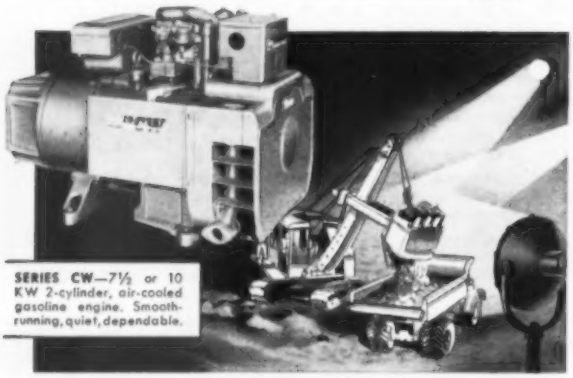


- VERSATILE "COMPLETE PACKAGE" SINGLE AND DUAL HEAD UNITS TO HARD FACE CRAWLER TYPE TRACTOR ROLLERS, IDLERS, AND RAILS *Automatically*
- A REXARC ENGINEER CHECKS YOUR INSTALLATION, PUTS THE EQUIPMENT IN OPERATION AND TRAINS YOUR OPERATOR ASSURING EXCELLENT RESULTS FROM THE VERY BEGINNING OF OPERATIONS
- CONTACT YOUR NEAREST DISTRIBUTOR OR THE FACTORY DIRECT FOR FREE DESCRIPTIVE BROCHURES. THE SAVINGS ARE TREMENDOUS!

PRODUCTS OF: The SIGHT FEED GENERATOR COMPANY — WEST ALEXANDRIA, OHIO, U.S.A.

Enter 192-A on card, page 167

Onan ELECTRIC PLANT NEWS Onan



SERIES CW—7½ or 10 KW 2-cylinder, air-cooled gasoline engine. Smooth-running, quiet, dependable.

Large-area floodlighting steps up safety, efficiency

High capacity, easily portable Onan Electric Plants give you big advantages for night lighting pit operations. Easily moved from job to job and from place to place on the site itself, Onan portable units have the capacity to light not only the work face, but approaches, job offices, ramps and dumps. Can be used to power motor-driven equipment and communications too. *Air-cooled models from 500 to 10,000 watts. Water-cooled 10 to 75KW. Air-cooled Diesel electric plants: 3,000 and 5,000 watts.*

Write for Folder of Portable Models

D. W. ONAN & SONS INC. Onan

3552A University Ave. S. E., Minneapolis 14, Minnesota

Enter 192-B on card, page 167

ON-THE-SPOT **CONVEYOR BELT REPAIRS.**

NO HEAT! NO EQUIPMENT!

with PANG cold self-vulcanizing kit

PANG conveyor belt patches form a perfect, long-lasting bond — add years to belt life. Why make a major operation of belt repairs? They're quick and easy with **PANG!** Send for complete kit today.

COMPLETE KIT #1600 CONTAINS:

32 ea. R-4 Patches, 2½" dia. (16 per box)
22 ea. R-6 " 3⅞" dia. (11 per box)
24 ea. L-3 " 2⅛" x 4⅞" (12 per box)
10 ea. L-5 " 2¾" x 5 5/16"
8 ea. L-6 " 1¾" x 9"
5 ea. octagonal patches #111, 7½" x 7½"
5 ea. oval patches #3, 5" x 8"
1 ea. 1 lb. can Pangit Compound A & B (2 lbs.)
1 ea. ½ lb. can Pangol A and B (1 lb.)
1 ea. 8oz. can Pang Vulcanizing Solution
1 roll stock Patch Material 70" x 6" x 1/20"
1 roll Surface Plate, 35" x 15" x 1/32"
1 ea. 2 lbs. can Belt Bonding Solution

TOOLS: Stitcher; Brushes (dusting, roughing, fluid); Knife; Prodder; Pliers.

Material Only 56.75
Tools 6.00
Complete Kit 62.75

Mail check for $56.75 for material or $62.75 for complete kit to Dept. PQ-1.

PANG **AUTOMATIC VULCANIZERS CORP.**
16 Hudson Street, New York 13, New York

Enter 192-C on card, page 167

BOUGHT 30 MORE

Since they switched to "Jimmy" Diesels

Pennsylvania quarry operators, D. M. Stoltzfus and Son, Inc., bought their first General Motors Diesel in a Koehring Dumptor back in 1945. Now they have more than 30 "Jimmys" operating in four plants, producing over 5,000 tons of crushed stone per day.

Job Superintendent Warren Benner says: "Interchangeability of parts is a decided advantage with GM Diesel engines. With a small stock of spare parts, we can take care of most service jobs ourselves and get equipment back on the job with minimum lost time. GM Diesels start quickly, are easy to operate and give us long periods of trouble-free performance between overhauls. I can't trace one instance where GM Diesels have failed us on the job."

Add the faster work output of these dependable 2-cycle engines to ease of maintenance and lower cost of interchangeable parts, and you have the reasons operators everywhere standardize on GM Diesels. For full facts, call your GM Diesel distributor or write us.

DETROIT DIESEL Engine Division of General Motors, Detroit 28, Michigan

GM GENERAL MOTORS DETROIT DIESEL POWER

Regional Offices: New York, Atlanta, Detroit, Chicago Dallas, San Francisco

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario

Now—more than ever—it pays to standardize on GM Diesel—available in 1485 applications of power equipment built by more than 175 manufacturers

Parts and Service Worldwide

GM "6-110" Diesel drives hammermill at plant in Cedar Hill Quarry of D. M. Stoltzfus & Son, Inc., Talmage, Pa.

Enter 193 on card, page 167

Tru-Stop Brakes

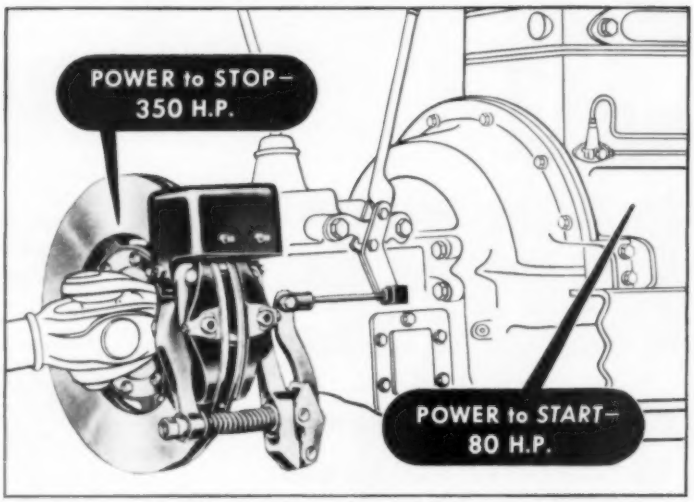
Meet Every Heavy-Duty Safety Requirement

OFFER POSITIVE PROTECTION AGAINST RUNAWAY OR PARKING ACCIDENTS—AT LOWEST COST

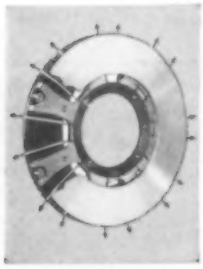
HERE IS WHY:

They have surplus power required for emergency service—no dangerous self-energizing

TRU-STOP Heavy-Duty Emergency Brakes are not only excellent parking brakes. They serve as a complete, independent and fully reliable braking system. Operating on the propeller shaft they enable the driver to continue on safely in the event of service brake failure. TRU-STOP brakes have the surplus braking capacity to be used *repeatedly* as an auxiliary to service brakes.

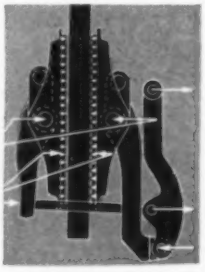


Brakes actually do more work than the engine in terms of horsepower Where it takes 80 HP to accelerate to 20 miles per hour, it takes 350 HP to make a safe stop from 20 miles per hour within required limits



Ventilated to throw off heat

Brake efficiency depends on ability to throw off intense heat —rapidly. Discs of TRU-STOP brakes are exposed to the air even during the braking operation. Ventilated design circulates air *between* the disc plates.



Give uniform brake pressure

Disc of TRU-STOP brakes is "squeezed" between the flat surface of the shoes. Effort applied to brake lever operates front and rear lever arms simultaneously. Pressure is exerted on the center of each shoe. Entire lining surface is in contact.

FOR SAFE, ECONOMICAL, HEAVY-DUTY BRAKING WITH MAXIMUM LIFE AND MINIMUM MAINTENANCE

TRU-STOP Brakes are used on a great variety of mobile and stationary equipment

SUCH AS—

- Motor cranes
- Road rollers
- Dump trucks
- Power dividers
- Cooling tower fans
- Oil well pumps
- Cold header presses
- Scrubbing machines
- Wire rope stranders
- Fork lift trucks
- Motor scrapers
- Tractors
- Graders
- Diamond core drills
- Electric locomotives
- Oil well servicing rigs
- Railway inspection cars
- Shapers
- Power take-offs
- Winches
- Motor shovels
- Tractor loaders
- Conveyors
- Hard rock drill positioners
- Mine locomotives
- Power presses
- Railway power ballisters
- Cable tool spudders
- Aerial tram cars
- Tension wire stringers

We will be glad to answer any questions or give you more detailed information about TRU-STOP Heavy Duty Emergency Brakes. Send for Catalogs DH-33 and DH-530

Automotive and Aircraft Division
AMERICAN CHAIN & CABLE

601 Stephenson Building, Detroit 2
2216 S. Garfield Street, Los Angeles 22 • Bridgeport 2, Conn.

ACCO

Enter 194 on card, page 167

QUICK SWITCH . . .
3 boom changes in one day!

Chicago Gravel Co. feels that one good Manitowoc deserves another — that's why the company recently added another Manitowoc Model 2000 Clamshell to move gravel at its Rockdale, Ill., plant. Mr. G. E. Singletary, General Superintendent says, "We purchased this new Manitowoc 2000 Clam because we know we can count on simplicity of design and long operation, without much maintenance. The rig is very easy to convert from dragline to clam and back again. We have changed as often as *three times in one day* to suit some particular operation at hand. The line speed is well-suited for either bucket and the operator likes the machine very much."

Consistent high output is the rule with this rig. The Model 2000 moves 800 to 1000 tons of gravel daily, in addition to dragline excavation, and has put out as much as 1200 tons a day when loading railroad cars. The clam is also used for charging bins with gravel and stockpiling it for future orders.

See why more and more plants and quarries are turning to Manitowoc for increased production and trouble-free performance. Investigate the complete, profitable line of Manitowoc shovels, draglines and clams — available in 1-yd. to 5½-yd. to fit any job you have. Call your helpful Manitowoc distributor today!

Manitowoc Engineering Corp., Manitowoc, Wis.

SHOVELS 1-5½ YD. **Manitowoc** CRANES 20-100 TON

LOOK AT THESE MODEL 2000 *Features*

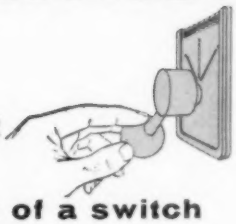
- Simple design with only 13 gears and pinions in the entire machine — only working gears turn.
- Exclusive slide pinion arrangement requires only one set of clutches to drive travel, swing and boom hoist.
- Real stability on any ground provided by a massive one-piece carbody mounted directly on crawler frames — long, wide crawlers — scientific weight distribution throughout the rig.
- Fast closing-hoisting line speed is 200 feet per minute with holding line speed even faster at 214 f.p.m.
- Smooth, positive control with plunger drum clutches; disc-type swing clutches; optional torque converter and air controls.

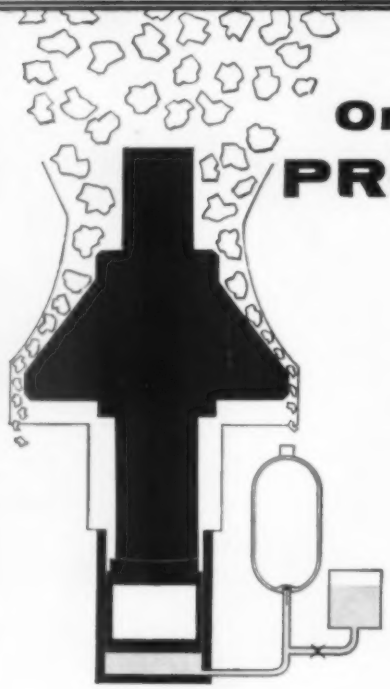
Enter 195 on card, page 167

The only crusher that provides

One-Man, One-Minute PRODUCT CONTROL

GET
ANY
CRUSHER
SETTING
at the flip of a switch





It's Hydraulic

Cone is supported on a hydraulic jack. Crusher setting is controlled by the amount of oil in the jack. A flip of a control switch, conveniently located, positions the cone at any setting.

Adjustment to product size . . . compensation for wear . . . emergency unloading — all are one-man, one-minute operations — all are accomplished with a flip of a switch in the *Hydrocone* crusher. Compare this speed and simplicity with the time-consuming inconvenience of any other method of changing crusher setting—in any other gyratory type crusher. You'll discover that the *Hydrocone* crusher can actually add production hours to your day . . . can give you increased tonnage and greater profits by eliminating excessive downtime.

New Bulletin Available

Bulletin 07B7145C tells the complete *Hydrocone* crusher story. Get your copy from your nearby A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

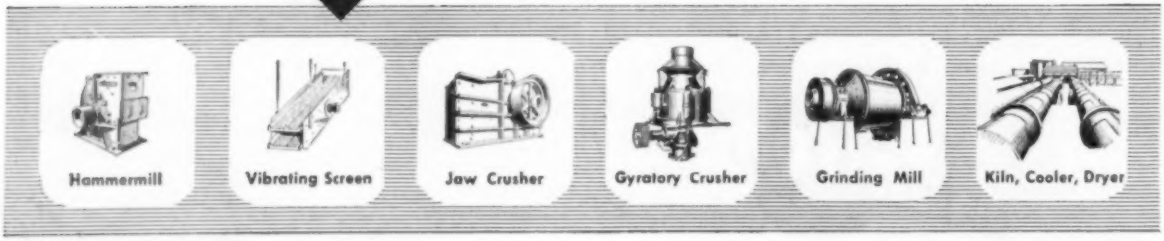
Hydrocone is an Allis-Chalmers trademark.

Hydrocone CRUSHER

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

A-5261



Enter 196 on card, page 167

Now . . . a New High in Dust Filter Efficiency . . .

New SLY "ROLL-CLEAN" Dynaclone

Patent No. 2583039
Patent No. 2695681
Other Patents Pending

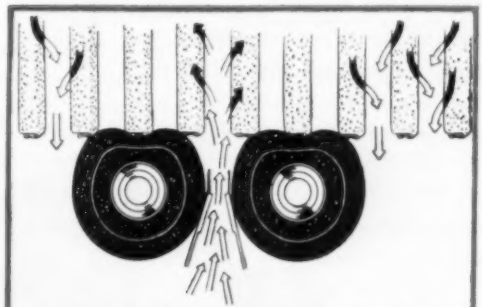
THESE NEW FIELD-PROVEN FEATURES

- Easier filter bag changing.
- Greater cloth area.
- Fewer operating parts.
- Free-rolling cleaner — no sliding.
- Complete dust seal — automatic seal adjustment.
- Easy access to all dust filter parts for inspection and servicing.

PLUS THESE TIME-TESTED DYNACLONE ADVANTAGES

- Constant suction at dust sources — complete dust collection.
- Self-cleaning for continuous operation.
- No auxiliary motors or blowers required for filter-bag cleaning.
- Greater filtering capacity and smaller space requirements — more cloth per cubic foot of filter than any other make.
- Lower power requirements.

The original self-cleaning dust filter, the Dynaclone has proven itself the most efficient dust filter ever made. The "Roll-Clean" Dynaclone combines design simplicity and rugged construction to insure even greater operating efficiency . . . even longer trouble-free service.



NEW "ROLLER CLEANER" provides greatly simplified method of cleaning dust from filter bags. Resilient rubber rolls automatically adjust to form a positive dust seal as each row of bags is cleaned by atmospheric air.

NEW CATALOG
36-page Bulletin 104 gives full details about "Roll-Clean" Dynaclone and other Sly Filters . . . contains valuable engineering information. Write for copy.

SINCE 1876 SLY

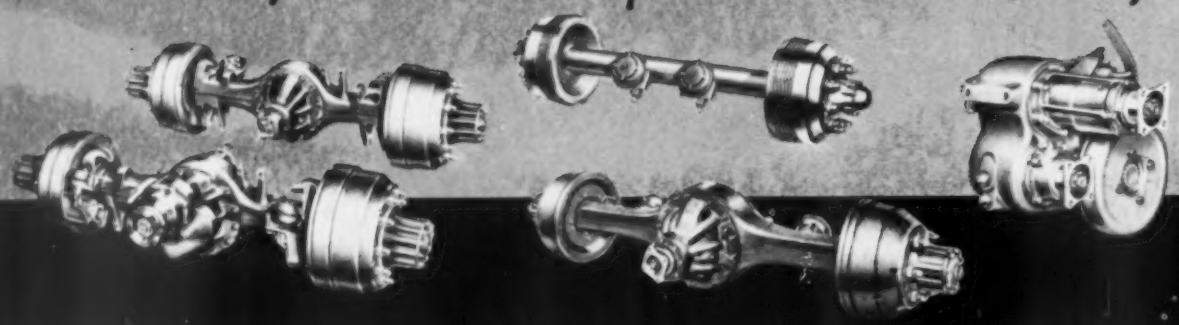
THE W. W. SLY MANUFACTURING CO.
4745 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

Enter 197 on card, page 167

SPECIFY...

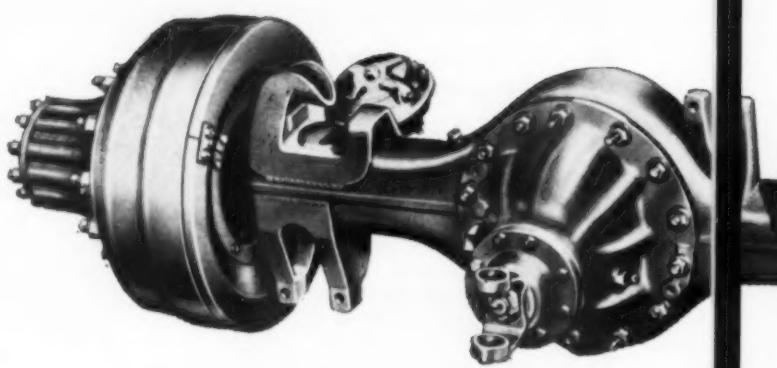
TIMKEN-DETROIT®

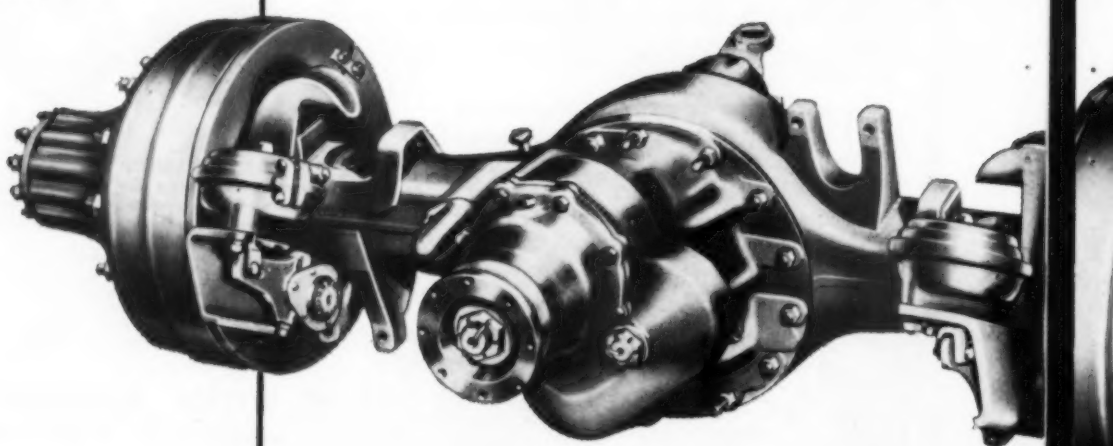
Today's Most Complete Line of Quality



Whatever your requirements for highway or off-the-road equipment—Timken-Detroit® offers you a full line of driving, trailer and front axles . . . brakes and gear boxes . . . backed by over 50 years of manufacturing experience and proven by continuing field and laboratory research.

Proving the superiority of design, engineering features and quality that go into every Timken-Detroit product is the *Lightweight Tandem.*





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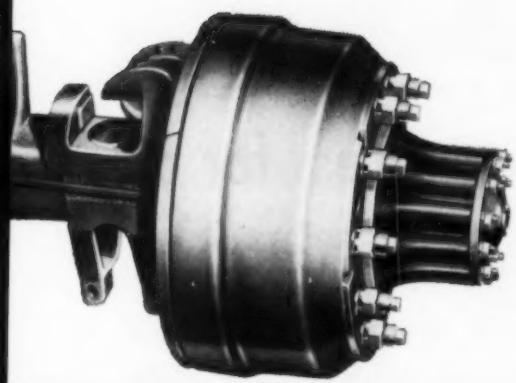
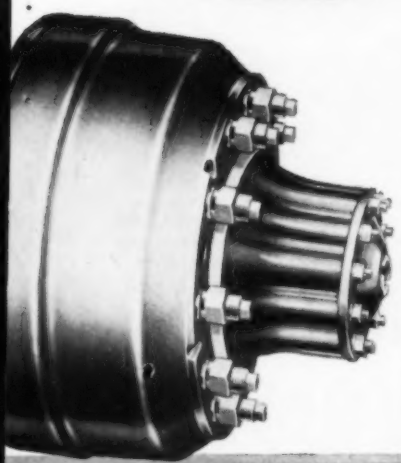
Products of

Rockwell Spring and Axle Co.

Axles and Brakes for Commercial Vehicles

TIMKEN-DETROIT® LIGHTWEIGHT TANDEM GIVES YOU...





Greater Payload Capacity! Up to 700 pounds lighter than any other unit of equal capacity, this new tandem will give you up to 26,000 extra ton-miles payload in every 75,000 miles of operation.

Parts Interchangeability means easier maintenance. Almost all the parts in this new tandem—gears, pinions, differentials and brakes—are interchangeable with parts from Timken-Detroit standard single axles. This assures you more productive road time . . . faster, simpler, more economical maintenance . . . and smaller parts inventory.

Inter-Axle Differential divides torque evenly between axles . . . yet permits wheels of one axle to revolve faster or slower than wheels of the other axle. This means both axles are doing equal amounts of work . . . driving parts and tires last longer.

Driver-Controlled Lockout! With Timken-Detroit Inter-Axle Differential, the driver can obtain the advantages of straight-through drive under slick conditions by locking out the differential at any driving speed.

Big, Dependable Hypoid Gears rotate in correct direction for maximum gear and bearing life.

Plants at: Detroit, Michigan • Oshkosh, Wisconsin
Utica, New York • Ashtabula, Kenton and
Newark, Ohio • New Castle, Pennsylvania

TIMKEN Detroit AXLES
TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN
The Accepted Standard

WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSSES AND TRAILERS

SIX OF THESE JAEGER 600'S POWERED THE EXCAVATION DRILLING FOR NEW TIME & LIFE BUILDING, NEW YORK CITY

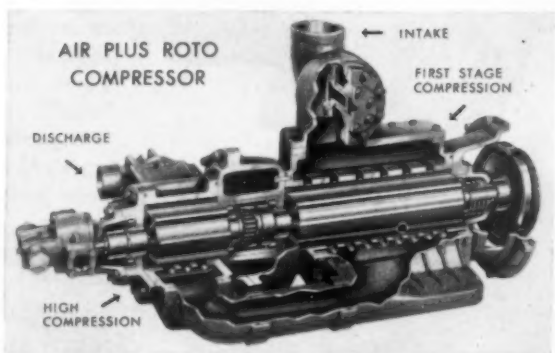
Jaeger gives you a lower, known cost for air

"MAKES" 600 CU. FT. OF AIR IN 1650 REVOLUTIONS ON 1.2 LBS. OF FUEL

Using the same GM 6-71 diesel engine, a Jaeger "600" delivers the same air volume at 1650 rpm that all other rotaries need 1800 rpm to produce.

In 8 hours' steady operation, a Jaeger averages 72,000 fewer revolutions, saving miles of engine piston travel and pounds of fuel. Because operation is always below the continuous horsepower curve, engine maintenance is lowest. As for the compressor unit, *many Jaegers have been operated more than 8000 hours without replacing a single vane.*

Similar high efficiency at low speed (1700 rpm full load speed compared with 1800 to 2150) is characteristic of Jaeger 125, 250 and 365 models. Check with any Jaeger user—or ask your Jaeger distributor for complete information that will help you cut your air costs on coming work.



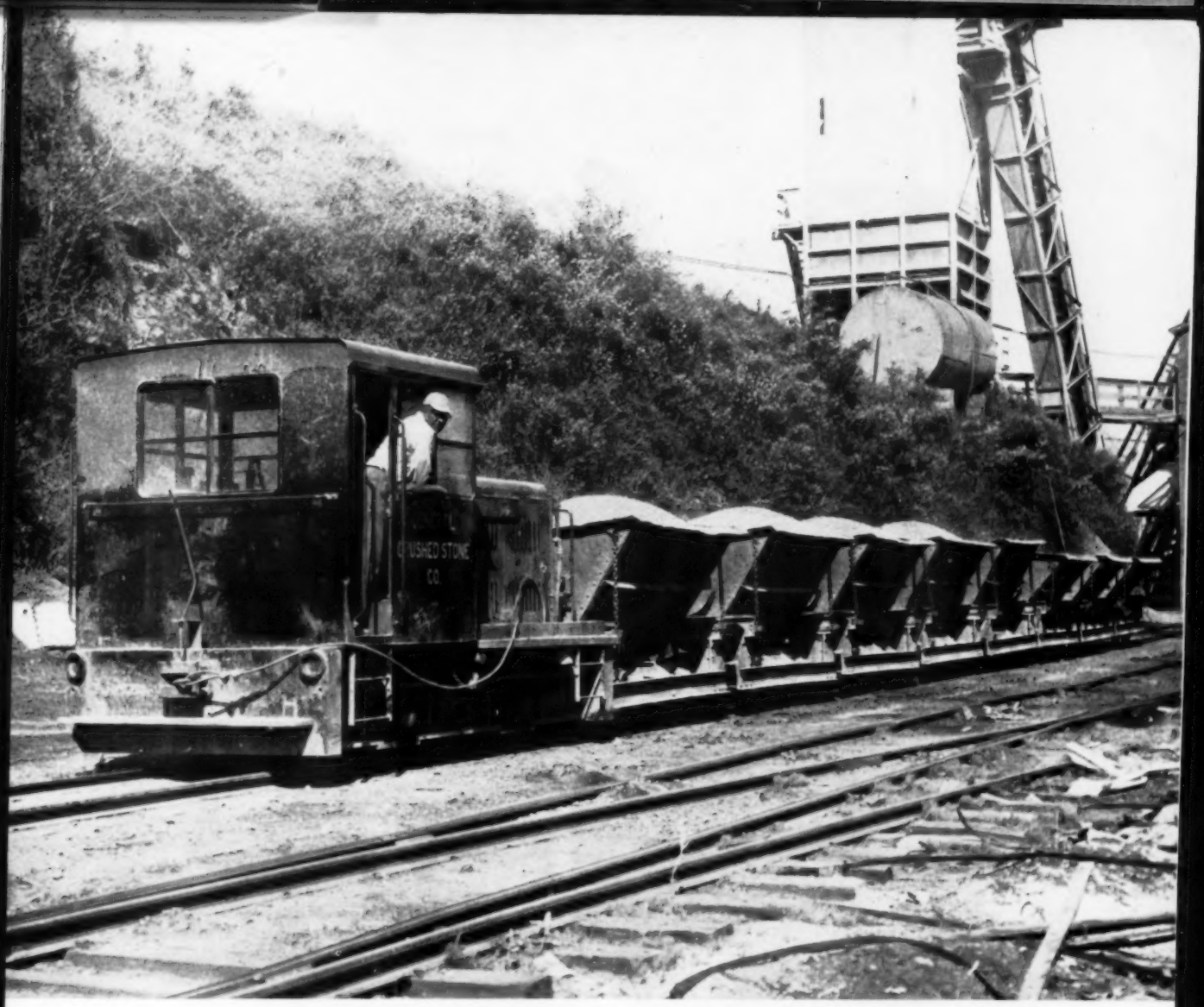
Jaeger oil-cooled 2-stage, single axis compressor unit — the first fully efficient rotary compressor. All sizes average an output of 500 cu. ft. of 100 psi air per pound of fuel consumed.

THE JAEGER MACHINE COMPANY

602 Dublin Avenue, Columbus 16, Ohio

PUMPS • SPREADERS • FINISHERS • CONCRETE MIXERS • TRUCK MIXERS

Enter 200 on card, page 167



20-Ton Plymouth Torqomotive hauls stone over 2000 feet of track nine hours daily at General Crushed Stone Co.

All-Weather Haulage Shows Extra Profits with a Plymouth on the Job!

It is a fact that's proved day after day on all kinds of switching, spotting and hauling jobs—it takes a reliable locomotive like Plymouth to meet today's demands.

They'll show you their great pulling power and stability to best advantage when you give them big jobs to do—run them on steep grades—operate them around the clock.

Your operators will welcome the effortless performance of a Plymouth. You will get more tons hauled with less gasoline, oil or power consumed. We can show you proof of that, whether you choose mechanical or Torqomotive Drive—the Plymouth-designed transmission coupled to hydraulic torque-converter. To find out how well a Plymouth locomotive meets your everyday haulage needs, send us a brief outline of your operation. Address: Plymouth Locomotive Works, The Fate-Root-Heath Company, Dept. A-15, Plymouth, Ohio.

Read how this user applauds Plymouth...

"We're very well satisfied with the performance of our Plymouth Torqomotive . . . since replacing our steam locomotive a year ago. We're saving time daily—and down-time for repairs has not exceeded 10 hours the entire year!"

Mr. Harry McGuirk, Sup't
GENERAL CRUSHED STONE CO.
Glen Mills, Pa.

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

RAIL POWER

PLYMOUTH LOCOMOTIVES in Progressive Industry throughout the world

Enter 201 on card, page 167

Sam Pulaski

(1833-)

Sam Pulaski is a wise old gent,
smart as any the Lord ever sent.
His job is the same day after day—
blasting down mountains the same old way.

But there's a story to this old guy
on why he'll use Austin 'til he die.
It started back before you and me,
as far back as eighteen thirty-three.

That was the year when Sam was the one
chosen to see the canal was done.
Canal was complete 'cept for a hill
bigger'n McKinley and steeper still.

Though Sam took the job he felt quite sad,
knew he needed more strength'n twenty had.
But Sam had heart and this was his tune,
"Get me some help and get it here soon."

As fate would be, Austin caught the cry
and filled his wagon near to the sky
with explosives aplenty, fuse galore
to trample trouble that lay before.

First went the mountain almost as fast
as Austin took to make up the blast.
Then boulders were made stones and stones sand
when Sam and Austin went through the land.

The canal was done in less'n a day
and still flows freely or so some say.
But this to Sam and his roughneck friend
was just the beginning, not the end.

To blast, to prime, to clip or to drill,
for every need Pulaski must fill
he's called on Austin since thirty-three,
quite a record I think you'll agree.

* * *

Now if you quarry or work a mine,
you must use products in our line.
So why not follow Sam's tested lead—
buy from Austin . . . everything you need.

USED IN 1833 AUSTIN EVER SINCE

AUSTIN POWDER COMPANY

CLEVELAND 13, OHIO

Other TL-20D features include:

HYDRAULIC TORQUE CONVERTER DRIVE • TIP-BACK BUCKET • POWER STEERING • 4-WHEEL DRIVE • 4-WHEEL POWER BRAKES • "HI-TRACTION" DIFFERENTIALS • STRONG, PIN-CONNECTED PLANETARY AXLES • 4-WAY ADJUSTABLE SEAT • REAR-AXLE DISCONNECT • EXTRA STABILITY • "BUILT-TO-TAKE-IT" CONSTRUCTION.

TL-20D TRACTOLOADER®, 2¼ cu yd, heaped • 100 diesel hp • Weight: 22,100 lb

MACHINE ON THE GO

Loader Operation Simplified by Tractomotive... Result: Increased Production

Here you see the only transmission shift lever that is necessary on the TL-20D TRACTOLOADER.

With this single lever, your operator has full control of the TL-20D's full power-shift transmission. He can shift into and out of any gear "on the go" — forward or reverse. There is no speed range lever, or any other shift lever, to slow him up. And this single-lever control is EXCLUSIVE WITH TRACTOMOTIVE.

Because your operator's work is simplified . . . your production is sure to be higher. Let a demonstration convince you. See your Allis-Chalmers construction machinery dealer.

THERE IS A FAST-WORKING TRACTO-LOADER® TO FIT EVERY JOB — 5 MODELS — ½ cu yd to 2¼ heaped . . . two and four-wheel drive.

* * *

See the TL-20D at the Sand and Gravel and Ready-Mix Convention — Tractomotive Booth No. 49, Chicago Coliseum. We will also be at the Crushed Stone Convention. Let's talk over your loading problems.

SOLD AND SERVICED BY YOUR ALLIS-CHALMERS CONSTRUCTION MACHINERY DEALER

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TRACTOMOTIVE CORPORATION, DEERFIELD, ILLINOIS

TRACTOMOTIVE CORPORATION, Dept. PQ
Deerfield, Illinois

☐ Please send TL-20D Literature
☐ Have salesman call

NAME .....
TITLE .....
COMPANY .....
ADDRESS .....
CITY ..... STATE .....

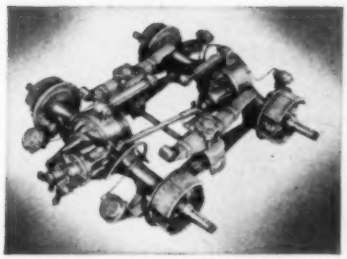
INTERNATIONAL six-wheelers cover the range from 22,000 lbs. GVW to 76,000 lbs. GCW in conventional and COE design. There is one practically custom-built for every hauling job in the world's most complete truck line. Widest choice of load-moving and load-carrying components to keep operating and maintenance cost lowest.

INTERNATIONAL **pickups with four-wheel drive** are all-truck built to give you the extra traction and pull to meet the toughest on- and off-highway requirements. Extra wide seats allow plenty of elbow room for three big men. And remember, you get the most powerful "six" in its class.

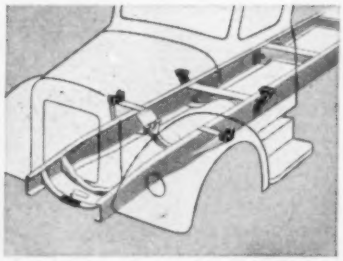
INTERNATIONAL TRUCKS

Longer Tandem Life

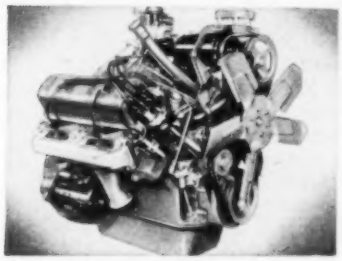
Just one reason why you'll find International Trucks cost least to own!



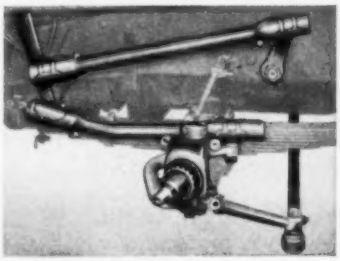
Plenty of pull on- and off-highway with sturdy, long lasting tandems. You get extra flotation, positive traction always.



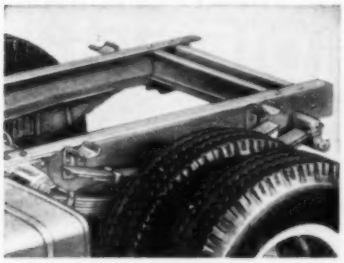
Cabs last longer even in the most severe operations with exclusive 5-point mountings. Quieter, easier riding, too.



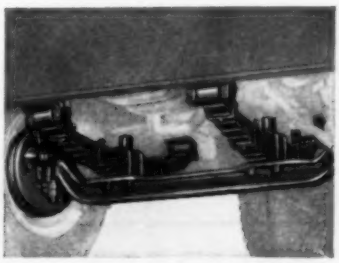
Save time, save money with the most powerful V-8's you can get—to 549 cu. in. Other power plants to 356 hp.



Easy to handle even in tightest spots with true geometric steering, cam and roller-mounted steering gears.



Plenty of strength for the toughest jobs and biggest loads with frames that have extra rigidity with proper flexibility.



Maximum load and life with choice of heavy-duty, heat treated high carbon steel axles to meet exact hauling needs.

Tough on- and off-highway jobs require tandems and all other parts that are built to stand up and take it . . . that will keep operation and maintenance costs 'way down.

And that's the way INTERNATIONALS are built. Cost records prove* this all-important fact – INTERNATIONAL Trucks cost *least* to own.

This superiority doesn't just happen. It's the result of INTERNATIONAL'S rigid policy to build trucks that will do the job better, do it longer and at least cost.

Why not follow the lead of men who know truck costs to the penny – men who have made INTERNATIONAL six-wheelers the sales leader for the past 22 straight years. Make your next truck an INTERNATIONAL.

**Signed statements in our files, from fleet operators throughout the U.S., back up this statement.*

cost least to own!

INTERNATIONAL HARVESTER COMPANY, CHICAGO

Motor Trucks • Crawler Tractors
Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

Russell H. Stewart Construction Co. Ltd. gets

100 TONS BONUS PRODUCTION *PER DAY*

with MURPHY DIESEL POWER

The Murphy Diesel powering this Commander Plant permits Russell H. Stewart Construction Co. to produce an *extra* 10 tons per hour of finished aggregate, according to a report from J. H. Godfrey, Vice President of the Orillia, Ontario company.

Figure the kind of profit *you* can make with the same kind of dependable, economical power.

If you work 250 days a year, those 100 extra tons per day add up to a 25,000-ton profit bonus . . . *because they're produced at no extra cost for labor, operation or maintenance!*

In fact, Murphy Diesels *reduce* production costs. As Mr. Godfrey reports, maintenance costs on their Murphy Diesel are "considerably lower." Low fuel costs and steady, uniform power add to Murphy's economical operation.

Figure the additional jobs you can handle, the lower bids you can make with the extra profit margin Murphy Diesels give you. Apply those extra yearly profits to the initial cost of your engine. You'll see why Murphy Diesel Power is your best buy on all counts.

Wherever your job is located, there's a dependable Murphy Diesel Dealer nearby. You can count on him for prompt, expert maintenance and parts service.

Murphy Diesel delivering 182 HP (continuous) powers plant producing crushed gravel for Ontario Dept. of Highways and for municipalities. "The Murphy Diesel is better," says the owner, "for starting in cold weather and in general maintenance."

MURPHY DIESEL

HEAVY-DUTY POWER for Rock Crushing

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

MURPHY DIESEL COMPANY

5307 W. Burnham St., Milwaukee, Wisconsin

SALES . . . PARTS . . . SERVICE

Throughout the Nation

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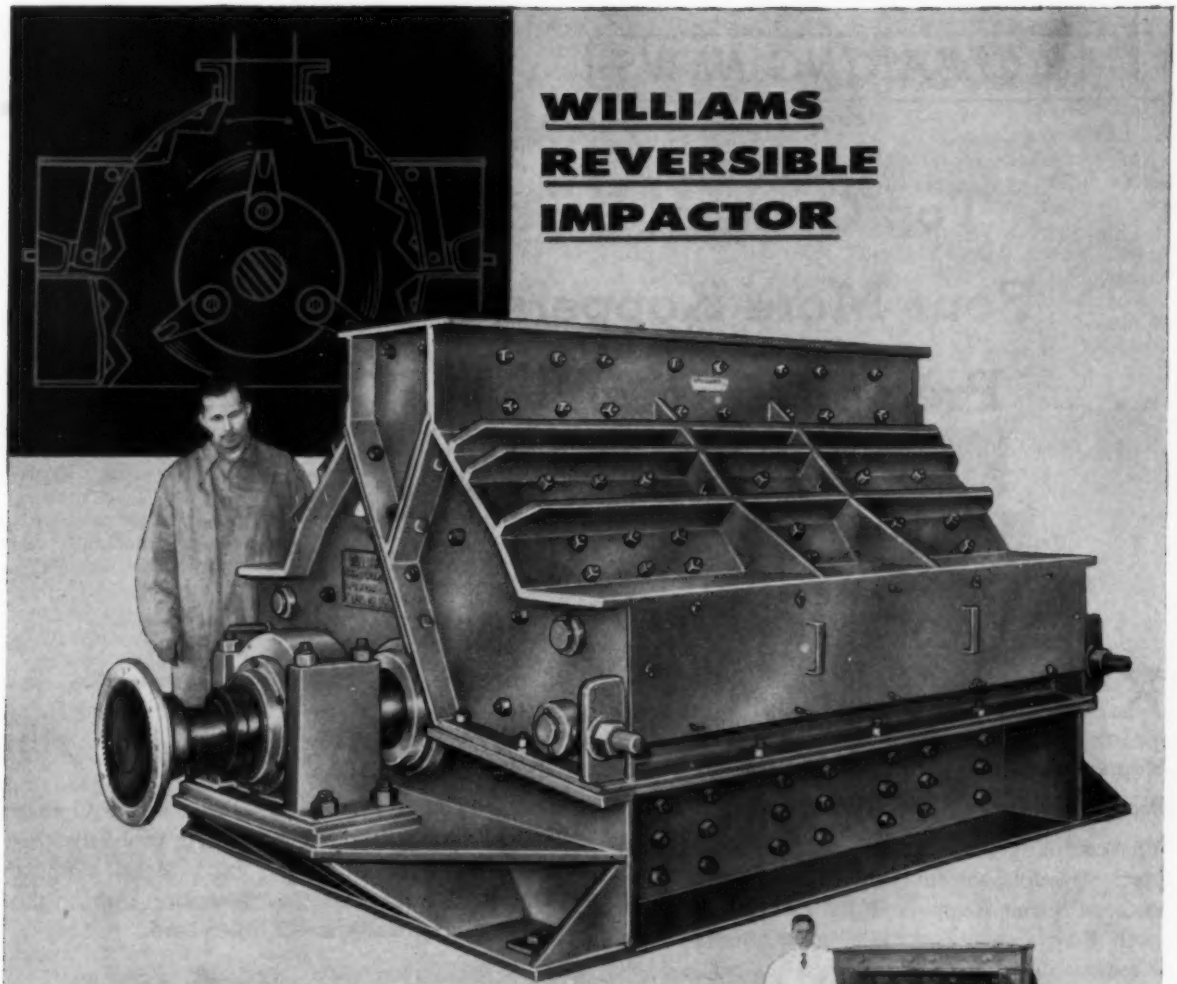
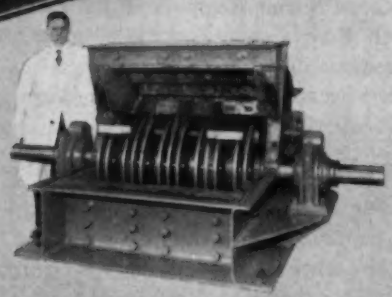
WILLIAMS REVERSIBLE IMPACTOR



- 100% Impact Reduction
- No Friction Or Abrasion
- Unobstructed Discharge
- Less Upkeep Expense

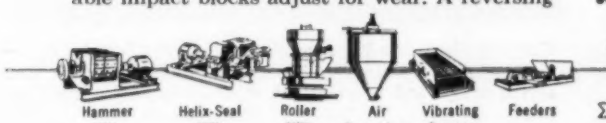


Internal view showing manganese steel impact blocks, hammers and liners. Rugged, heavy steel plate construction. Extra large shafts are mounted in oversize bearings sealed in self-aligning housings.

Unequalled For Secondary Grinding

Reduces limestone and material of similar hardness to 1½", ¾" or smaller. Properly adjusted, the Williams Impactor makes excellent material with the proper percentage of fines for road base course. Unusually low upkeep expense as reduction is 100% by impact. Material is fed to enter between the hammers and is thrown against the impact blocks setting up a repeated ricochet action which accomplishes the reduction. Adjustable impact blocks adjust for wear. A reversing switch on motor permits rotating hammers in either direction, to the left today and to the right tomorrow, thereby giving double hammer life. No grates are used. Entire bottom is open permitting unobstructed discharge of crushed material and less wear and tear. A size for every job. Let us tell you about one for your use.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
802 St. Louis Avenue — St. Louis 6, Mo.



WILLIAMS
CRUSHERS · GRINDERS · SHREDDERS
Oldest and Largest Manufacturers of Hammer Mills in the World

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GAS CLEANING NEWS

Top Cement Producer Orders Four More Koppers Electrostatic Precipitators for Gas Cleaning

Leading Company has ordered 8 Koppers Electrostatic Precipitators since 1950

KOPPERS Electrostatic Precipitators have provided such excellent service that this leading cement producer ordered seven additional Koppers units during the last six years.

Proves Performance on the Job

The company ordered its first Koppers Electrostatic Precipitator in 1950. Its operation was so successful that Koppers Units now collect dust in both East Coast and Gulf Coast plants. These Koppers units have proved economical and efficient because Koppers engineers were able to meet the exacting requirements of each application.

Supplies a Wide Range

These Koppers Electrostatic Precipitators range in capacity from 75,000 CFM to 132,000 CFM. And each Koppers unit has exceeded its guaranteed performance. Engineering know-how enables Koppers to economically satisfy each individual application.

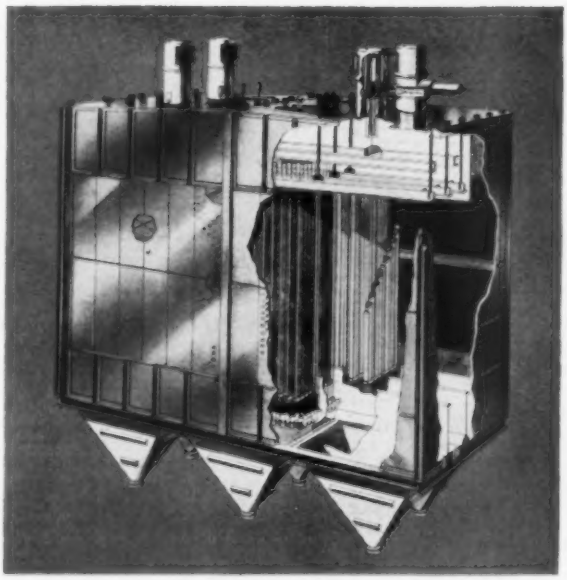
Meets Individual Plant Needs

Koppers custom-designs Electrostatic Precipitators for cement and other dry dust applications: cleaning rotary or vertical kilns, calcining kettle stack gas, collecting dust for re-use, cleaning gases from finishing and raw mill operations. Koppers tailors a power unit by one of three methods to fit specific needs and can also integrate an automatic power regulator into the overall design.

Backed by Know-How

Koppers has over 75 years' experience in industrial gas cleaning. In addition, Koppers maintains extensive research facilities at Verona, Pa., and Baltimore, Md. Manufacturing facilities at Baltimore produce gas cleaning equipment for every size and type of plant.

You can put all of this experience and equipment to work solving your gas cleaning problems. Just write KOPPERS COMPANY, INC., Metal Products Division, Industrial Gas Cleaning Dept., 4501 Scott Street, Baltimore 3, Maryland.



Cutaway photo of a Koppers Electrostatic Precipitator shows shell, vibrators, and collecting and discharge electrodes. The actual design and arrangement of elements vary widely because Koppers Electrostatic Precipitators are custom-designed to fit requirements of each particular installation.

Enter 208 on card, page 167

Dorrco FluoSolids Systems Planned by Two Concerns To Calcine Phosphate Rock

Two Western fertilizer producers plan to install Dorrco FluoSolids Systems to calcine phosphate rock at new plants in Idaho and Wyoming.

The Central Farmers Fertilizer Company's Georgetown (Idaho) plant, under construction and scheduled to go into operation in 1958, will employ a fluidized system to handle 25 tons of phosphate rock per hour. Organic materials which interfere with processing steps later in the flowsheet will be burned off in this operation.

As the result of extensive and successful field tests with a fluidized pilot plant, San Francisco Chemical Company has purchased a two-reactor FluoSolids System to calcine 1,000 tons of phosphate rock per day at its Leefe plant in Wyoming. Operating parallel at 6,300-ft. elevation, each reactor will be capable of roasting a maximum of 25 tons of very abrasive and sticky feed material.

Universal Atlas Cement Co. To Enlarge Alabama Plant

Officials of the Universal Atlas Cement Company have begun to implement plans for new construction at the firm's Leeds (Ala.) plant which will boost cement production substantially. Rust Engineering Company, Birmingham, Ala., was awarded the general contract.

According to Charles B. Baker, president of the United States Steel subsidiary, work will begin immediately on the installation of a finish-grinding mill and supporting facilities for the production of portland slag cements, both regular and air-entraining types.

The original Leeds plant, located about 18 miles east of Birmingham, was built in 1906. It was replaced in 1938 and has since been modernized.

Four of the 11 plants of Universal Atlas are now producing portland slag cements—those at Universal, Pa., Buffington, Ind., Milwaukee, Wis., and Duluth, Minn. Production of portland slag cements will also begin at the Hudson, N. Y., plant early this year.

New York Trap Rock Corp. Purchases $250,000 Shovel

The New York Trap Rock Corporation has purchased a $250,000 shovel manufactured by the Harnischfeger Corporation, Milwaukee, Wis., for its quarry in Haverstraw, N. Y.

Weighing 357,000 lbs., the new electronically-controlled shovel replaces the unit which has been in service at the quarry since 1928. It works 10 percent faster, and its bucket capacity is 627 tons.

The shovel was acquired to boost production in an effort to meet the constantly increasing demand for crushed stone used in federal highway programs and other types of building.

FRANK H. OATES, for 29 years in charge of cement sales in the Oakland, Calif., area for Pacific Cement & Aggregates, Inc., has retired.

Canadian Johns-Manville Completes Mill Extension Closes Two Older Mills

With the completion in December of an extension to its Mill 5 at Asbestos, Que., Canadian Johns-Manville closed down Mills 4A and 4B. The latter had produced nearly 7,000,000 tons of asbestos.

The Mill 5 extension includes all the improvements in milling techniques, packaging, and material handling methods, working conditions, etc., which had been developed and proved in the original Mill 5.

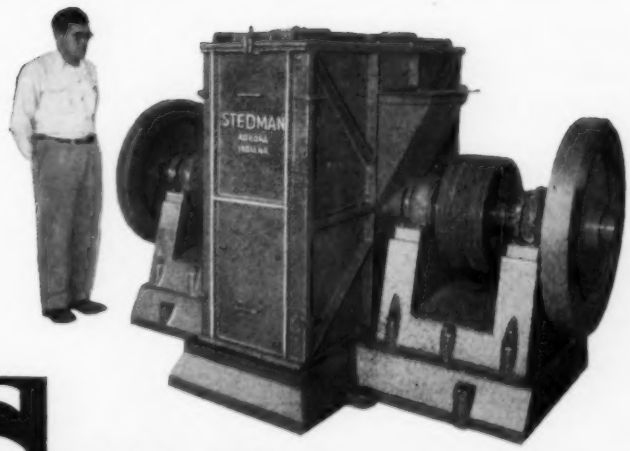
ARE YOUR STONE AND GRAVEL PRODUCTS CUBICAL IN SHAPE?

ARE THEY FREE OF SOFT STONE AND CLAY?

WILL THEY MEET SPECIFICATIONS AND PASS ABRASION TESTS?

DO YOU NEED MORE OF THE FINER SIZES IN YOUR SAND PRODUCTS?

CAN YOU MEET TODAY'S SPECIFICATIONS ON AG LIME?



STEDMAN CRUSHING EQUIPMENT
SOLVES MOST OF THESE PROBLEMS!

Write for complete details on the STEDMAN PRINCIPLE OF IMPACT CRUSHING to meet today's requirements.

MORE THAN A CENTURY OF KNOW-HOW
STEDMAN FOUNDRY AND MACHINE COMPANY, INC.
Subsidiary of United Engineering and Foundry Company
AURORA, INDIANA Founded 1834

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"THIS LUBRICANT PRACTICALLY ELIMINATED BEARING REPLACEMENTS"

Says- C. O. SPARKS, INC.
& Mundo Engineering Co. of Los Angeles, Calif.

"Prior to using LUBRIPLATE, we were replacing shaker screen bearings within 60 to 120 days due to lack of or faulty lubrication. Since we started using LUBRIPLATE seven years ago, we have only replaced two shaker screen bearings and these because of natural wear. We now use LUBRIPLATE for general lubrication throughout our plant."

W. T. Ellington, President
Mundo Engineering Co.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose . . . LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

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Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Considerable discussion has arisen from time to time over the legal question: Can a zoning board lawfully increase inconveniences and discomfort to owners of homes by extending and enlarging present operations of a plant which processes nonmetallic materials?

Last month a higher court rendered an important decision by answering this question in the affirmative, if the testimony shows that the inconveniences and hazards to the general public are beneficially affected.

For illustration, in *Kaczor v. Elmhurst-Chicago Stone Company,* 141 N. E. (2d) 14, the testimony showed facts, as follows: A state law zoned a 197-acre tract of land owned by the Elmhurst-Chicago Stone Company. This zoning law permitted operations as follows: "Mining, loading, and hauling of sand, gravel, humus, black dirt, or other aggregate, but not including any screening, crushing, washing, or storage equipment or structures, excepting as may be specifically authorized for a limited period by the Zoning Board of Appeals."

The Elmhurst-Chicago Stone Company mined gravel on its tract of land and hauled it to a processing plant 1½ miles distant for some time. Then it applied to the zoning board for permission to install washing, screening, and crushing equipment at its mining site. The board granted the application, stating that the actual amount of heavy truck traffic would be decreased if the plant were permitted to operate at the mining location, as there will only be the one-way traffic with the finished products instead of the additional amount which would be required if the pit run product were hauled to the present processing plant and then returned in part over the same roads after processing.

Certain owners of nearby residences appealed to the higher court on the ground that the zoning board had exceeded its authority in granting the stone company's application to wash, screen, and crush rock and gravel at the location of the mining operations.

It is interesting to observe that the higher court approved the zoning board's decision, saying:

"In our opinion the findings in this case complied with the statute. Here the practical difficulties are the added amount of heavy truck traffic to which the board expressly referred and the added transportation costs that must obviously accompany it. That this hardship is unnecessary appears from the finding that the proposed change in operations would make no appreciable difference to the plaintiffs (home owners)."

Hence, while the owners of nearby homes are inconvenienced, the hazards of heavy truck traffic on public roads will be considerably decreased, to the advantage of the general public.

Purchaser Gives Bad Check

According to a late higher court decision, the failure of a purchaser of nonmetallic merchandise to see that a bank check given to the seller of the merchandise is paid is a definite breach of the contract by the purchaser, and the seller's obligations immediately cease.

For instance, in *State v. Scholder,* 300 Pac. (2d) 384, the testimony disclosed that a dealer sold certain merchandise to one Barrett for $8,000. The materials were delivered "in part" by the seller to Barrett, but there remained a balance due of $55.92 for which Barrett gave his personal bank check. When the seller discovered that Barrett's check for $55.92 was no good for want of sufficient funds in the bank, he refused delivery of the balance of the materials to Barrett, who was very much angered and immediately filed a suit against the seller for embezzlement. The lower court convicted the seller, but the higher court reversed the verdict, saying:

"We find here no evidence of concealment or felonious intent, or any act upon the part of the defendant (seller) which was injurious to a right of the purchaser or by which any undue advantage affords ground for a finding of fraudulent intent."

In other words, this higher court held that a bank check is deemed to be cash, and the instant a bank check given by the purchaser of merchandise is returned to the seller unpaid, the purchaser has breached his pur-

chase contract, and the seller is privileged to stop all further performance under the contract.

Employee Recovers Compensation

Last month a higher court answered this often asked legal question: If a motor truck owner is injured or killed while hauling gravel or other materials on a contract basis, can he recover compensation under the State Workmen's Compensation Act?

For instance, in *Woods v. Tucker,* 312 Pac. (2d) 452, it was shown that one Tucker owned his truck and was killed while using it to haul gravel for Woods when his truck collided with one driven by another employee of Woods.

In subsequent litigation Woods testified that Tucker worked by the hour and was under his direction and control and that he told Tucker where to get the gravel, where to spread the gravel, and where to dump the gravel.

In view of the testimony the higher court awarded compensation to Tucker's dependents and said:

"Where compensation is paid on a per yard or per mile basis and the employer controls and directions the manner, method and time of performance of the work the relation created is that of master and servant and not that of principal and independent contractor."

Contractor Dumps on Private Property

According to a late higher court decision, a contractor who dumps refuse on private property without lawful permission is liable in heavy damages.

For illustration, in *Strauss v. McCurdy,* 143 N. E. (2d) 620, it was shown that a contractor dumped dirt, rock, stone, and other similar material upon the vacant lot owned by one Strauss without authority of Strauss.

Strauss sued the contractor for damages and the higher court held that the contractor must pay Strauss the cost of having the premises restored to the condition in which they were before the contractor committed the wrongful acts.

In other words, the contractor must haul from the lot all the refuse he dumped there or pay Strauss the cost of having the refuse removed. This court said:

"It is the opinion of this Court that the judgment of $1,200.00 is ample compensation for restoring his (Strauss') lot to its original condition."

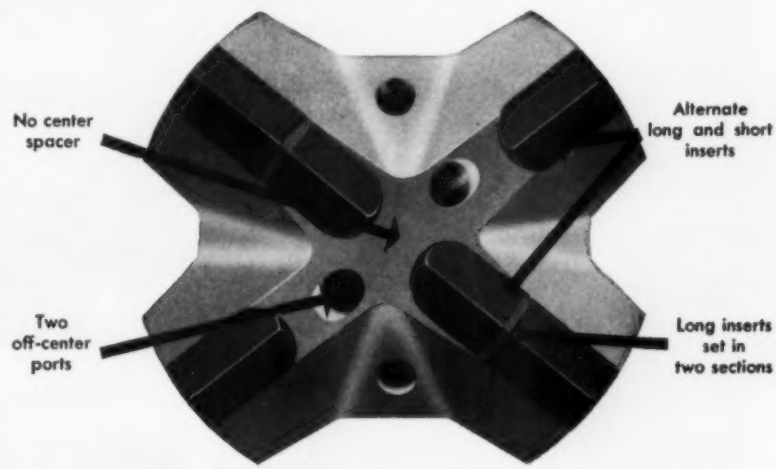
Who Is Best Doctor?

A few weeks ago a higher court held that an employee who suffers from silicosis must be paid compensation under the State Workmen's Compensation Act based upon the "best doctor's" testimony. Also, this higher court held that the decision rendered by the lower court as to dependable testimony will be generally affirmed by the higher court.

For illustration, in *G. S. Products Corporation v. Casey,* 303 S. W. (2d) 736, it was shown that an employee, of the G. S. Products Corporation suffered total and permanent disability by reason of his permanent disablement from silicosis upon which tuberculosis was imposed. In addition to recovery for total and permanent disability, he was allowed by the lower court to recover hospital expenses of $1,500.

The employer appealed to the higher court on the grounds that there was no definite proof that Casey had contracted silicosis. However, the higher court approved the lower court's award, saying:

"Who is the best doctor, who is to be given credit, and who is to be given weight in determining this kind



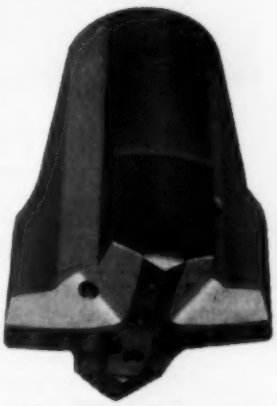
Only KENNAMETAL* PX Rock Bits

have these four exclusive features to give you faster penetration . . . longer service life

Each of these Kennametal features can mean savings to you:

- End milling the bit body to receive the carbide inserts eliminates the need for a center spacer
- Two short inserts permit two water ports to be located off-center where they will not clog.
- Setting the long inserts in two sections makes them stronger and lengthens bit life.
- "X" design eliminates rifling and speeds penetration by providing space for fast clearance of large chips.

*Trademark C-3046



Sizes from 2½" to 5" are available in the "X" design. Call your Kennametal Representative or write KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

INDUSTRY AND KENNAMETAL ...Partners in Progress

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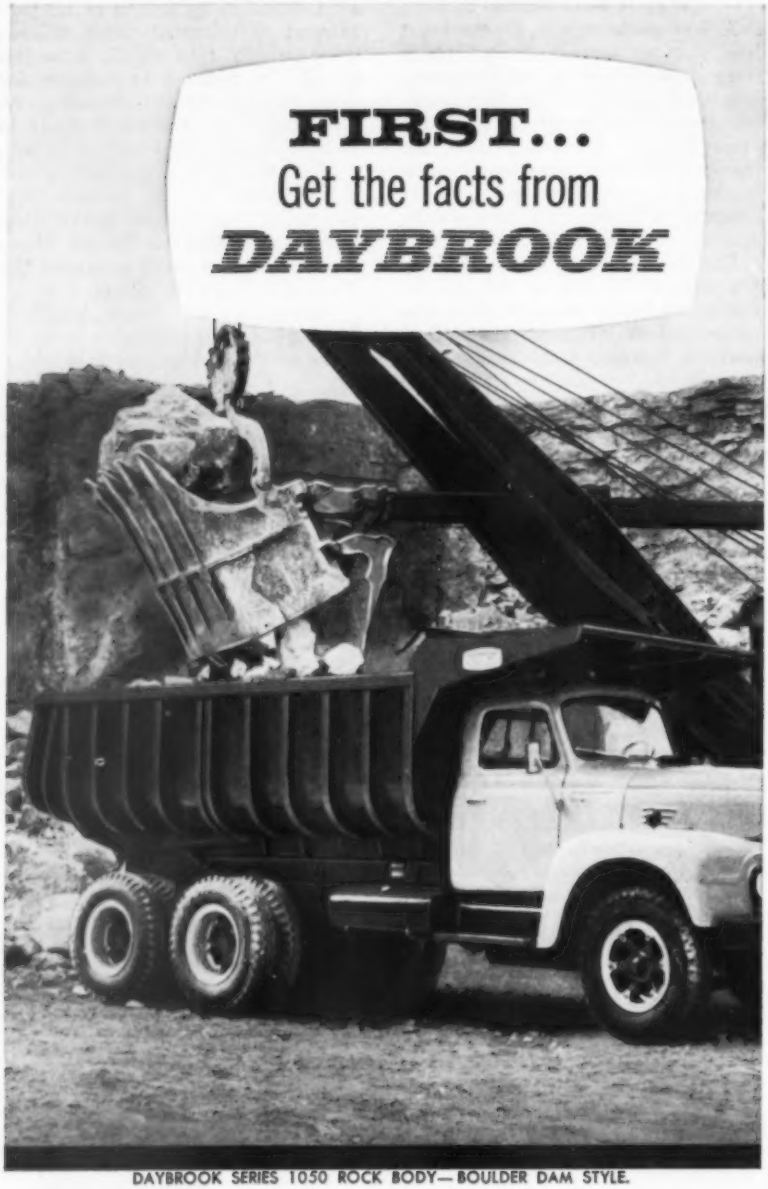


DAYBROOK SERIES 1050 ROCK BODY—BOULDER DAM STYLE.

Facts that PAY-OFF on "Rock Routine"

RUGGED is really descriptive of Daybrook rock bodies and hoists. They're built to withstand the smashing impact of heavy rocks and boulders dropped from shovels. They're built to take the day-to-day "routine" dumping required in quarry and mine operations. True, Daybrook rock bodies and hoists "team-up" to perform better and longer . . . really PAY-OFF on the "rock routine".

Here are the FACTS . . .
Write for Daybrook folders illustrating the full-line hoists and bodies. Address: Dept. PQ-1

DAYBROOK Speedlift® TRUCK EQUIPMENT

DAYBROOK HYDRAULIC DIVISION
YOUNG SPRING & WIRE CORPORATION, BOWLING GREEN, OHIO

of a question, is up to the lower court who we feel will and do very carefully weigh the evidence as propounded on the one side or the other and then after hearing this evidence they make up their minds where they think the preponderance lies and what justice demands without regard to sympathy for an injured claimant. We affirm the judgment below."

For comparison, see *Richards v. J-M Service Corporation,* 188 P. (2d) 939. That court said:

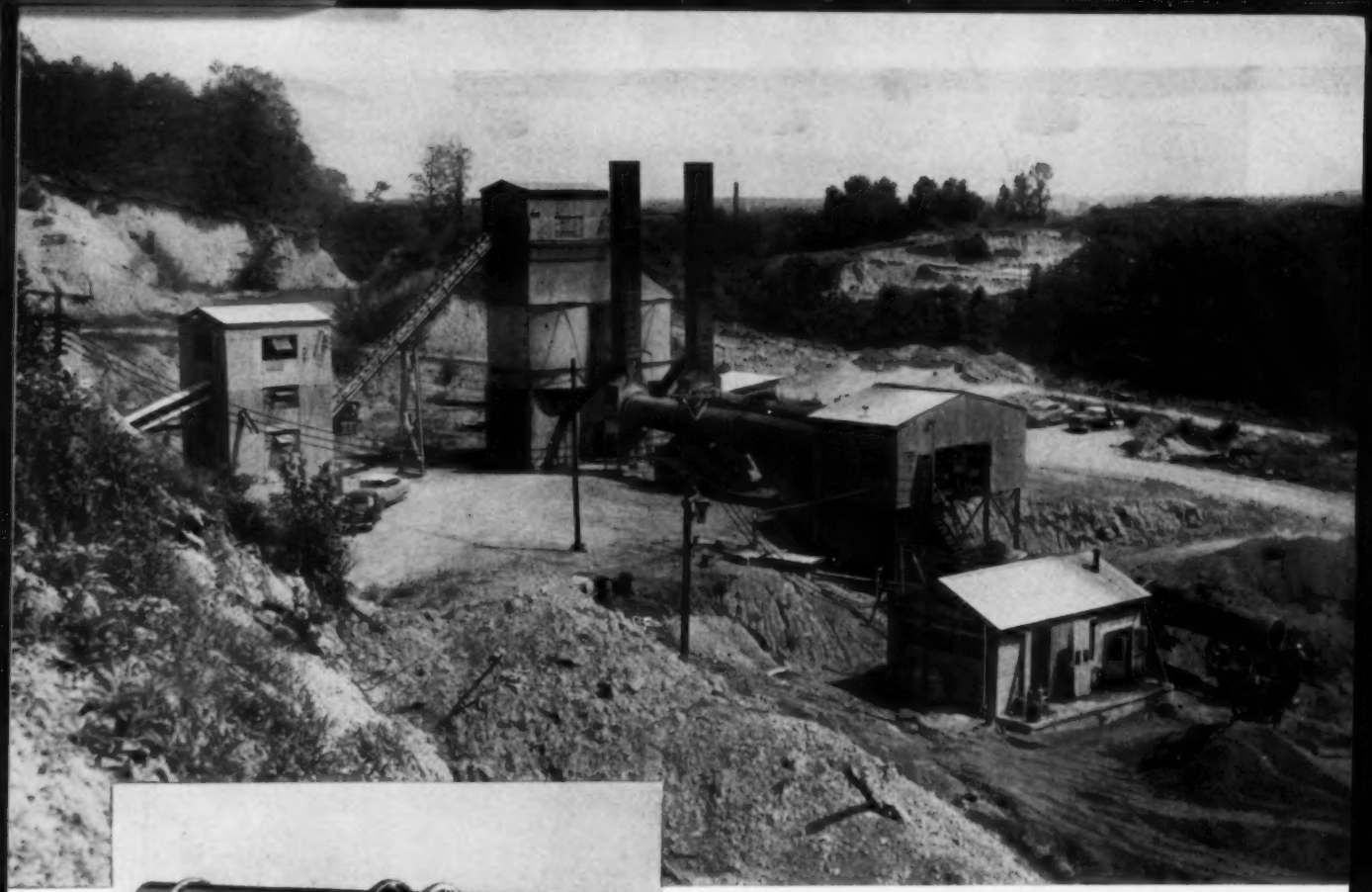
"If one qualified doctor testifies that an accident caused or aggravated a condition resulting in disability and the lower court sees fit to base a finding of fact upon such testimony, this court cannot change or disregard the finding even though ten or more other qualified doctors may have testified to the contrary."

Allowance for Depletions

During the past I have received many letters and inquiries from readers on the subject of "depletion" for saving federal income tax payments. Last month a higher court rendered an interesting decision on this subject of law which answers a majority of legal questions. I shall review this decision.

First, however, it is well to state that the allowance for depletion for income tax purposes has been a controversial subject for years. The need for and fairness of some allowance for depletion proceeds from the fact that the production of income through the exploitation of natural resources is accompanied by an inevitable consumption of capital in the form of the gradual exhaustion of the natural resource being exploited. Thus the allowance serves to offset the injustice of classifying only as income what might be regarded as income commingled with return of capital and serves also as an incentive to encourage capital expenditures in the direction of discovery and exploitation of natural resources.

The law describes three kinds of "depletions." Cost depletion, based upon the cost to the taxpayer of the particular deposit, seeks to return to the taxpayer free of tax that portion of his cost attributable to the amount of the deposit used up in earning the income on which he is taxed during a given taxable year. Discovery depletion seeks to reward the taxpayer for the discovery of unknown natural deposits and has usually been based upon the fair market value of the deposit within thirty days after the date of its discovery. Percentage depletion is based upon a fixed percentage of the income



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Desired capacity of plant per day is_____.

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Select the best for each particular purpose from the full complement of types and classes of refractories which are especially suited for the various conditions involved in the many different rotary kiln operations.

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Basic Refractories for High Temperature Zones of Rotary Cement Kilns

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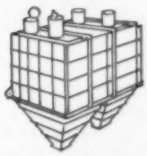

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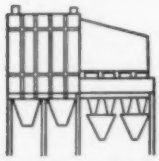

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realized during the taxable year from the exploitation of a piece of property—the percentage varying, depending upon the kind of deposit involved.

With the gradual enlargement of the categories of mineral properties to which the percentage depletion became applicable, the Congress has at the same time automatically eliminated discovery depletion in respect to such deposits. In general, percentage depletion has remained as an alternative to cost depletion, so that even if the taxpayer fails to establish the cost of the property, he nevertheless may be entitled to the allowance of a percentage depletion.

For illustration, in *Dragon Cement Company v. United States of America,* 244 Fed. Rep., (2d) 513, the higher court held that the Dragon Cement Company is entitled to a percentage depletion deduction based upon its gross income from cement after the ordinary treatment processes were normally applied.

The testimony showed that the Dragon Cement Company had mined unmarketable mineral calcium carbonate. Later during a manufacturing process, it converted a cement filter cake into powder by a kiln process which had effected a chemical change in the mineral.

The court held that the cement company's allowable depletion base was to be arrived at by including the income allocable to kiln and post-kiln processes as well as pre-kiln processes and in the gross income from mining. This decision was reached notwithstanding the federal tax agent's opinions and also notwithstanding the treasury regulation limiting the depletion allowance to manufacturing processes which had occurred before any chemical change had taken place in the products. This court said:

"The operation began with drilling and primary blasting from the face of the quarry by the open pit method to obtain the cement rock. Treatment or "beneficiation' then occurred at the plant!"

This higher court refused to agree with the government's contention that mining terminated, and that the depletion base was arrived at, when the mine operator had prepared the cement rock for conversion, and that the subsequent operations, during which it underwent a chemical change and ceased to be a mineral, constituted a manufacturing process, not allowable in computing the depletion base.

Not Attractive

According to a late higher court decision, if a thing, on property, which causes an injury to a child is not "attractive", the property owner is not liable in damages.

For instance, in *Knight v. Kaiser Company,* 312 Pac. (2d) 1089, it was shown that a company owned and maintained premises on which it had placed large piles of sand and gravel. There were no fences, guards or railings around these sand and gravel piles. One day a boy 10 years old who had been digging in a sand pile died from asphyxiation when the sand collapsed about him.

In subsequent litigation the higher court held the company not liable in damages to the boy's parents, saying:

"The owner of property does not assume any duty to one who is on his premises by permission only and as a mere licensee, except for wanton or willful injury inflicted upon the licensee while on the premises."

For comparison, see *Anderson v. Reith-Riley Construction Company,* 112 Ind. App. 170. Here a company removed a large amount of sand from its property, leaving a hole 100 ft. long, 50 ft. wide and 10 ft. deep, with perpendicular walls. A boy, 9 years of age, was attracted to the hole, where he excavated below the surface and was killed in a cave-in which followed.

The court held the company not liable.

Contractor Must Not Follow Defective Plans

Recently a reader asked a timely question the answer to which will prove valuable in future litigations to all readers. Here is the question, as follows: "If a contractor follows plans and specifications prepared by a property owner who is liable if the finished job is unsatisfactory?"

According to a recent higher court, the answer is: The contractor is liable.

For example, in the late case of *Brasher v. Alexandria,* 41 So. (2d) 819, the testimony showed that a contractor entered into a written contract with a property owner by the terms of which the contractor agreed to furnish all material and labor to complete a job in strict accordance with the plans and specifications. The plans and specifications were incorrect but the contractor followed the same. The finished work was unsatisfactory and the property owner sued the contractor for heavy damages.

The property owner contended that the contractor was at fault although he had followed the plans and specifications, and that he must bear the $13,588 expense necessary to repair the defective work.

The higher court agreed with this contention. The higher court held the contractor liable to the property owner and said:

"The contractor was obligated to correct any deficiencies therein."

For comparison, see *Magnan & Company v. Fuller,* 222 Mass. 530. This court held that when a contractor enters into a contract to construct a structure in accordance with plans and specifications, there is no warranty on the part of the property owner that the work can be properly and satisfactorily done by following the plans and specifications. This court held that it is the duty of the contractor to examine the contract, plans, and specifications, and to determine whether it is possible to do the work satisfactorily according thereto, before entering into the contract.

This court further explained that the contractor must use his own good judgment whether or not he should follow the plans and specifications to perform satisfactory work.

Patent Claims Invalid

According to a late and leading higher court decision, an inventor may obtain a patent, but, nevertheless, the patent may be held by the higher Federal Court to be without any value.

For illustration, in *Johnson v. California Batching Equipment,* 242 Fed. (2d) 793, it was shown that an Inventor obtained a patent No. 2,138,172 on a cement hopper located within a sand and rock hopper. Each hopper was independently supported so that its contents could be weighed seperately and the cement discharged simultaneously with the aggregate by gravity while water is supplied to the aggregate. The inventor claimed that his invention had these advantages: (1) a reduction in the amount of cement lost through "dusting" (2) the reduction of "balling" and "gumming" by preventing the cement from hitting the mixer sides or mixer blades before the aggregate does (3) a speeding up of the final and necessary "pre-mixing," or "mixing" (4) a preshrinking of the size of the total of ingredients prior to transportation to the job site; (5) some reduction of batching plant size and height, with resultant cost of construction saving.

The higher court held claims 1 and 5 invalid whereby competitors could use the invention described in these claims without any liability. This higher court explained that since an older patent and invention disclosed a similar invention, the new patent is invalid.

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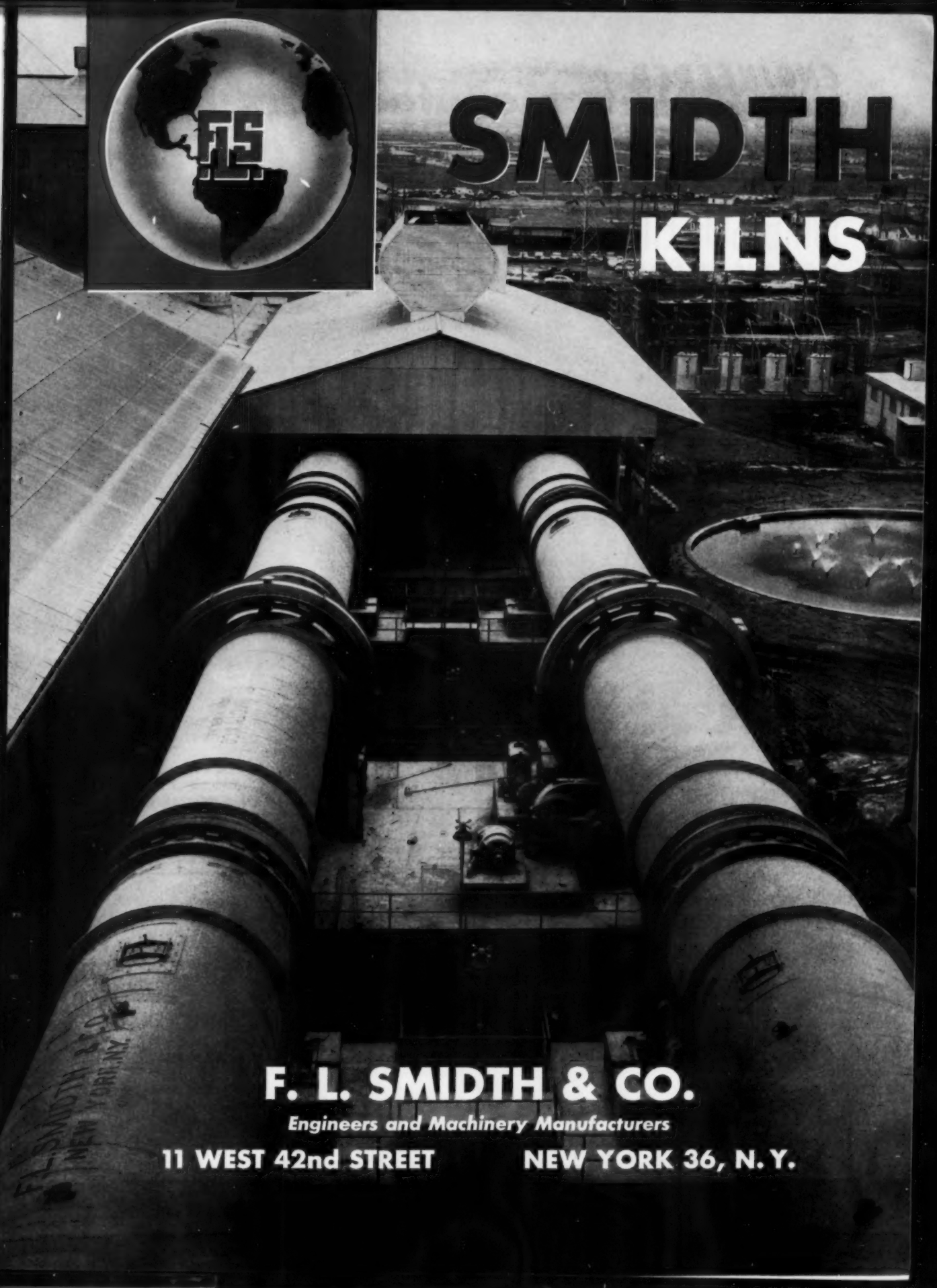
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Cleveland Wire screen sections are designed for all types of mechanical and electrical vibrating equipment.

Complete bulletin files, describing weaves, are available upon request. For faster sales service call Diamond 1-1832.

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Manufacturers' News

Worthington Corporation, Harrison, N. J., has available a limited number of distributorships for its new 1958 line of *Blue Brute* portable contractor's pumps.

The self-priming centrifugal pumps are available in all AGC sizes from 4M to 90M, and also an unrated 3M size.

Worthington offers an attractive finance plan to distributors to keep inventory costs to a minimum. Full particulars can be obtained from the Worthington Corporation, Contractor's Pump Section, Plainfield, N. J.

At a recent meeting, stockholders of the Baltimore and Ohio Railroad Company, Baltimore, Md., re-elected Howard E. Simpson, president; Roy B. White, chairman of the board; R. S. B. Hartz, secretary; and W. H. Ball, treasurer. The following vice-presidents were also re-elected: E. H. Burgess, W. L. Price, G. Murray Campbell, Frank J. Goebel, W. C. Baker, J. W. Phipps Jr., and Douglas C. Turnbull Jr .

Twelve directors of the company were re-elected, as follows: Roy B. White, chairman of the board; John D. Biggers; Howard Bruce; J. Hamilton Cheston; James D. Cunningham; Richard R. Deupree; F. Abbot Goodhue; Edmund L. Grimes; Richard Harte; Arthur W. Steudel; John C. Traphagen; and Howard Young.

St. Regis Paper Company, New York, N. Y., has opened a multiwall packaging division sales office in Oklahoma City, Okla. Bruce C. Kelly, formerly manager of the Company's Little Rock, Ark., office, heads the new office, located at 9508 Mahler Pl.

Mr. Kelly will work under the direction of the multiwall packaging division's southwestern district office, located in Dallas, Tex.

Edward J. Costello Jr., has been appointed vice-president in charge of sales for the Wiley Manufacturing Company, Port Deposit, Md. Mr. Costello has been with Wiley since 1954, when he joined the firm as head of the company's sales department.

Calumet Steel Division of Borg-Warner Corporation, Chicago, Ill., has completed plans for a multi-million-dollar expansion and improvement program at its facilities in Chicago Heights. The program, scheduled for completion in 1961, will expand the product line, and increase capacity by at least 40 percent.

Reo Division, The White Motor Company, Lansing, Mich., announces the appointment of two new district sales managers.

William A. Long has been named district sales manager of the Pittsburgh district sales office, replacing M. F. Sperry, who has retired. Prior

W. A. Long

L. Dolbee

to his promotion, Mr. Long was salesman at the Reo factory branch in Buffalo.

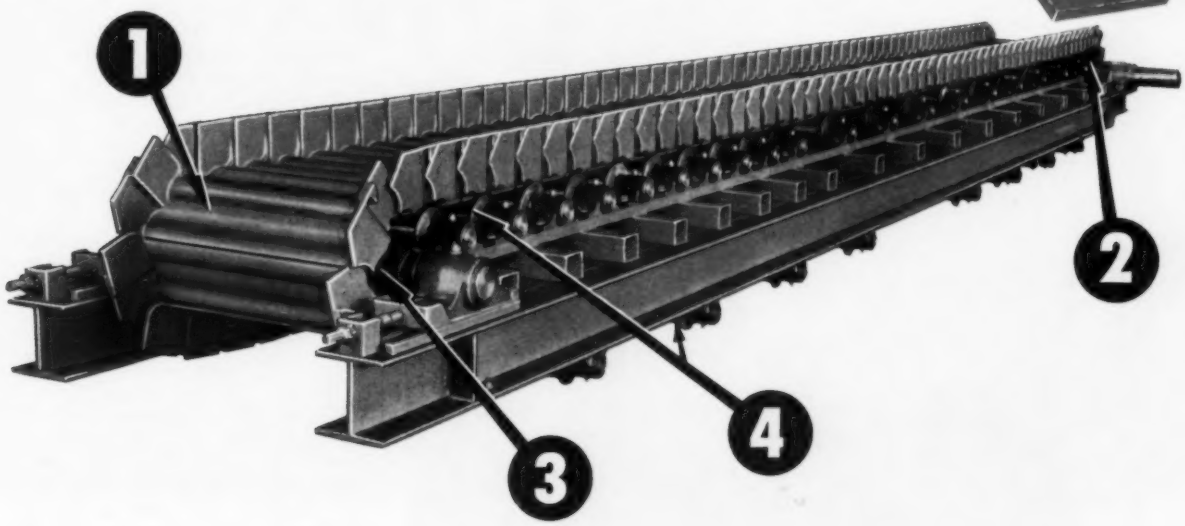
Larry Dolbee has been made district sales manager of the Washington, D. C., district sales office. In this position, Mr. Dolbee will also serve as special Washington representative for the Reo Division.

The General Tire & Rubber Company, Akron, Ohio, has promoted Floyd A. Yocke to the post of truck tire sales manager for the Akron division. He replaces Fred Rossi, who has been promoted to assistant commercial tire sales manager for the company.

Mr. Yocke has been with General for 11 years, and formerly served as Detroit territory sales manager.

Howard F. Barrows, advertising manager of Austin-Western, Aurora, Ill., retired on November 1 after 46 years of service with the firm.

WHERE WEAR COUNTS!



TISCO® PAN FEEDERS

❶ **FEEDER PANS** — Hammered by tons of heavy rocks and ore every minute, but tough TISCO Manganese Chrome Steel pans lick impact and abrasion, outwear ordinary pan feeders 5 to 1.

❷ **HEAD SPROCKETS** — One break-down here flattens production. For dependable durability Manganese Steel does the job.

❸ **IDLERS** — Manganese Steel in this vital part keeps idlers busy, smooth running.

❹ **ROLLERS** — When each roller must continually shake off shocks and abrasion nothing wears like Manganese Steel.

Picture tons of heavy, abrasive material smashing down on this TAYLOR-WHARTON Pan Feeder, month after month without a breakdown. The reason — tough TISCO Manganese Steel soaks up shock and abrasion, keeps production climbing, maintenance down. For further information write to:

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Cincinnati, O. — Birmingham, Ala. — Easton, Pa.

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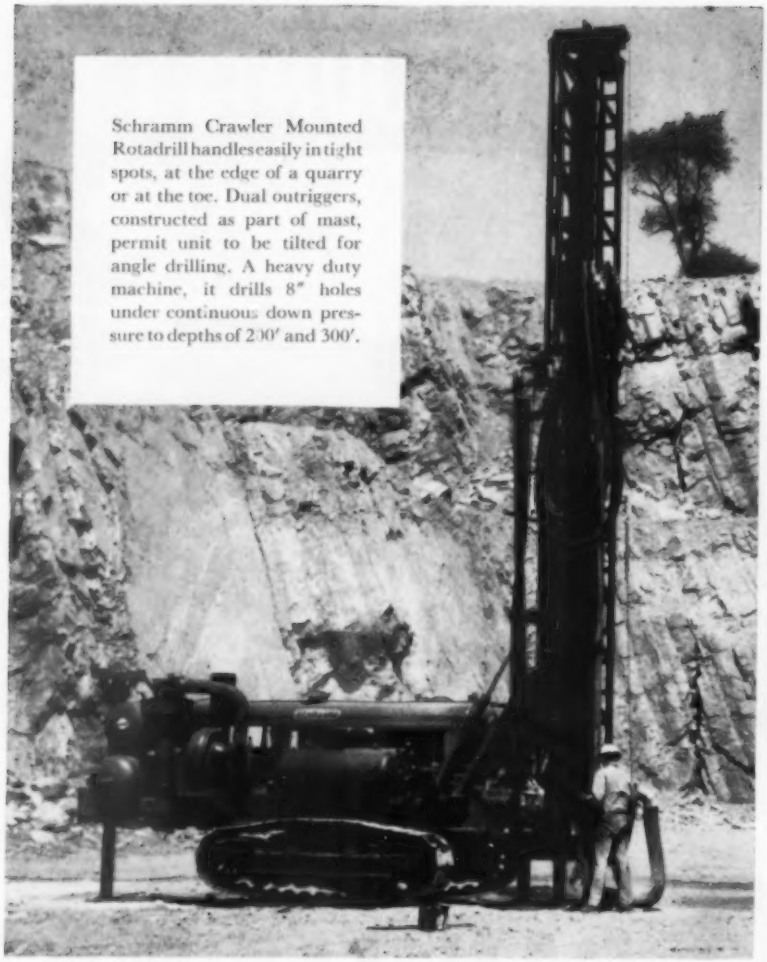

Schramm Crawler Mounted Rotadrill handles easily in tight spots, at the edge of a quarry or at the toe. Dual outriggers, constructed as part of mast, permit unit to be tilted for angle drilling. A heavy duty machine, it drills 8" holes under continuous down pressure to depths of 200' and 300'.

Announcing the New Schramm Crawler Rotadrill

Crawler Mounted Rotadrill now available at the price of a Truck Mounted Rotary Drill.

Low Cost. Compare! Dollar for dollar and feature for feature, the Schramm Crawler Rotadrill is your best buy in crawler mounted drill rigs. Electric or diesel engine driven, it costs no more than truck mounted rotary drill rigs.

Increased Footage. Hole capacity of 8" to depths of 200' to 300' makes it ideal for modern quarries and strip mines.

Air is supplied by a standard Schramm Model 600 compressor, delivering 600 cfm at 100 psi. Full hydraulic operation, which permits 3-speed rotation of bit, together with automatic continuous downfeed of 28,750 pounds, gives the Crawler Rotadrill its extra fast penetration, cuts down bit wear and eliminates the possibility of delay due to cave-ins and water entry. Where crevices and shattered rock often cause stuck steels, the Schramm Crawler Rotadrill drills up and out . . . saves valuable time.

Highly Maneuverable. Three outriggers, wide treads and low weight per square foot give the new unit outstanding maneuverability and stability. A low center of gravity provides excellent balance . . . it can turn on its own center. Two forward and reverse hydraulic levers provide easy positioning of the unit from hole to hole, or on the longer haul between drilling sites . . . steering clutches have been eliminated.

Other outstanding features include safe, easy access for driver . . . secondary dust collector . . . five lengths of 20' drill pipe carried in the mast. Bulletin CR-57 contains full details. Write for free copy.

Write us for full information, or ask your local Schramm Dealer for a demonstration.

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640 North Garfield Ave. • West Chester, Pa.

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Pettibone Mulliken Corporation, Chicago, Ill., has set up a new sales and service organization designed to bring more extensive sales and service facilities to Pettibone's customers throughout the United States and Canada.

Regional offices, under the direction of regional managers, have been established from coast to coast. All sales and service will come under their supervision. Each region is further divided into districts, with district managers responsible for sales within each district.

For complete customer service, all regions will maintain a staff of trained servicemen, supervised by regional service managers. Facilities are being made available throughout each region for parts stock.

The complete line of materials handling equipment manufactured by Pettibone and its subsidiaries will be handled through industrial equipment outlets.

Westinghouse Air Brake Company, Pittsburgh, Pa., has named PAUL I. BIRCHARD, vice-president, to the president's staff on special assignment. Mr. Birchard will assist in the coordination and integration of the various divisions and subsidiaries of the company.

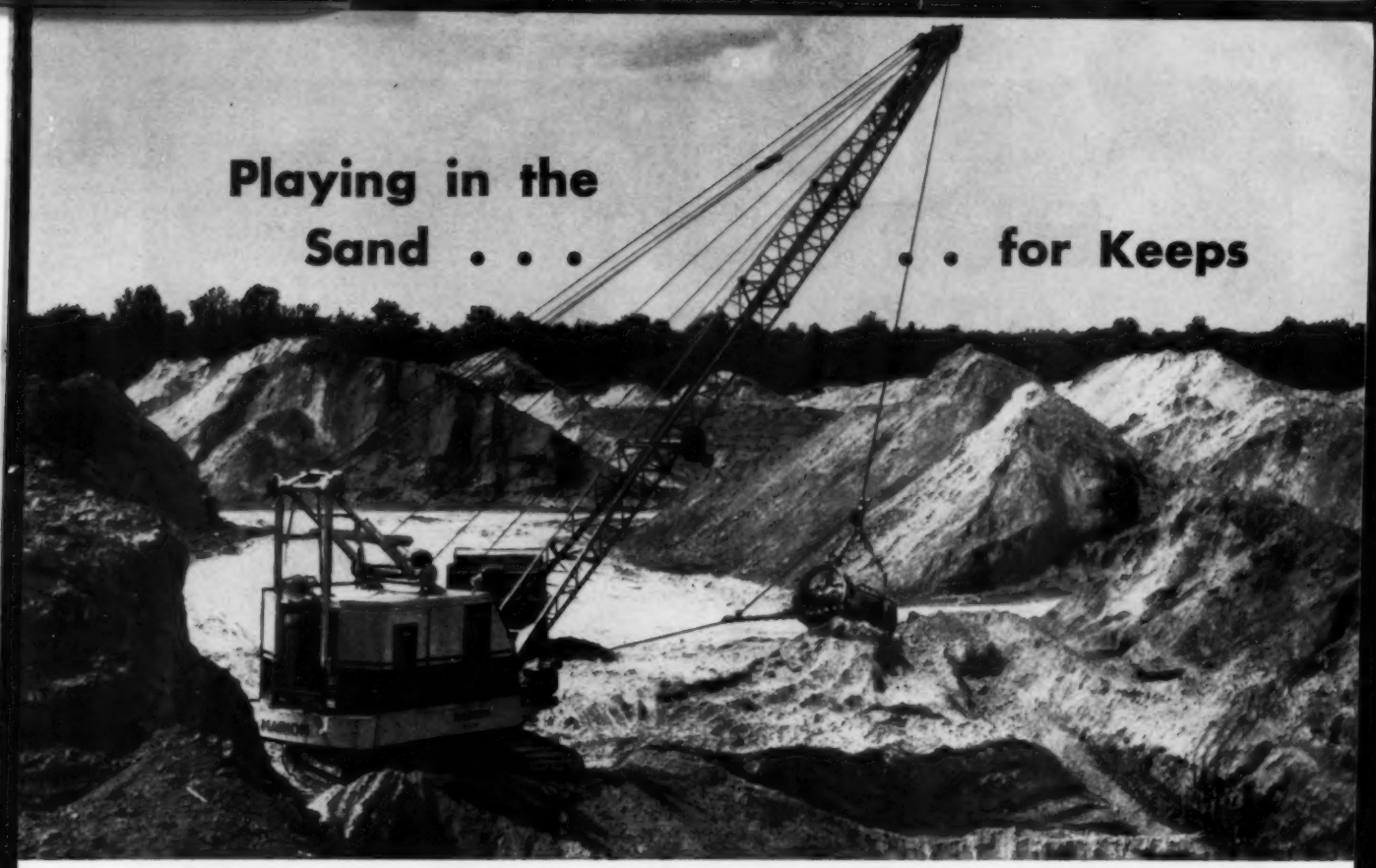
Mr. Birchard joined the company in 1954 as vice-president and general manager of its Le Roi Division, Milwaukee, Wis. He is succeeded in this capacity by FRANK J. ZIELSDORF, formerly staff assistant.

Recently-established Harris Bearing & Supply Company, 729 E. Henshaw Rd., Phoenix, Ariz., is a new distributor of *Fort Worth* mechanical power transmission equipment and bulk materials handling machinery manufactured by the Fort Worth Steel & Machinery Company, Fort Worth, Tex.

ALAN R. EAKINS has been appointed general sales manager, and H. W. GETHIN named assistant general works manager of the Refractories Division, H. K. Porter Company, Inc., New York, N. Y.

Mr. Eakins, promoted from assistant sales manager, was previously with General Refractories Company in various sales positions since 1949.

Mr. Gethin has been with Porter's Laclede-Christy Works since 1944, and previous to that, had 14 years of refractories production experience.



Firm Supplies Silica Gravel and Fine Sand for Richmond, Va., Area

A Marion 43-M equipped with a 1¼ yard dragline bucket on a 60-foot boom is the hub of activity for a Richmond sand and gravel firm.

It moves quickly from one part of the pit to another meeting the varying requirements for hard silica gravel and fine sand.

There's an interesting background note in connection with the selection of a Marion for this particular job. The general manager formerly was with another operation that owned a Marion 362. The operator formerly used a Marion 93-M at another sand and gravel plant.

Both of them expected good work from the Marion 43-M they selected; both are enthusiastic about the job it is doing.

Let your nearest Marion Distributor give you detailed information about the 43-M and other machines in the broad Marion line.

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Whatever your job requirement, there is a Marion machine of the right size and type for greatest efficiency

MACHINE	Shovel Capacity	AVAILABLE AS . . .			
		Hoe	Crawler Crane	Truck Crane	Special Crane
35-M	¾	Yes	Yes	Yes	—
43-M	1	Yes	Yes	Yes	—
362	1½	Yes	Yes	—	Yes
87-M	—	—	Yes	—	Yes
93-M	2½	Yes	Yes	—	Yes
101-M	3	—	Yes	—	—
111-M	4	—	Yes	—	—

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A Division of Universal Marion Corporation
Marion, Ohio

SEND ME information about **MARION** ..... yard shovels, ... yard hoes and ..... ton cranes (☐ crawler mounted ☐ truck mounted). ☐ Have a salesman call.

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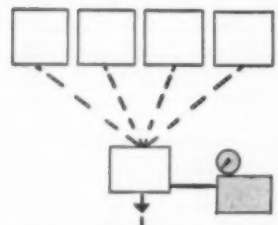
BATCHMASTER speeds concrete production

At last, completely automatic one-man batching for you. Batchmaster is the simple, speedy system for precise mixing of multiple ingredients to any desired formula. Accommodates all materials — solid, powdered, granulated, liquid. Provides *continuous* automatic control of all ingredients by weight. Boosts production, improves quality control, eliminates waste.

Simply dial the formula and mixing times, select number of batches, and press start button. Any number of ingredients are automatically fed, weighed, mixed and discharged.

No need for expensive, complex custom installations. Howe engineers *standard* Batchmaster systems tailored to *your* operation. Guarantees proper batching for most critical formulas. Cuts operating costs. Provides better control of material costs. Rugged construction for extreme operating conditions. You have a *different* batching problem? Send for detailed booklet illustrating the Batchmaster solution.



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Write for Complete Details

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THE HOWE SCALE CO. · RUTLAND, VERMONT

A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

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Crown Zellerbach Corporation has begun production in its new $4,000,000 multiwall bag plant at Bogalusa, La. The new plant covers 215 sq. ft., and is equipped to turn out over 50,000 bags a year for Crown Zellerbach customers in the southern, midwestern, and eastern areas.

Superintendent of the Bogalusa plant is W. H. Maxwell, who has been associated with the company since 1947. He has served as assistant superintendent in Crown Zellerbach's multiwall plant at Port Townsend and as multiwall superintendent at Antioch, Calif., and Camas, Wash.

ROBERT P. STUNTZ has been appointed assistant sales manager of the Refractories Division of the Babcock & Wilcox Company, with headquarters at the company's executive offices in New York, N. Y.

Mr. Stuntz came to the Chicago district sales office in 1946. In 1950

R. P. Stuntz

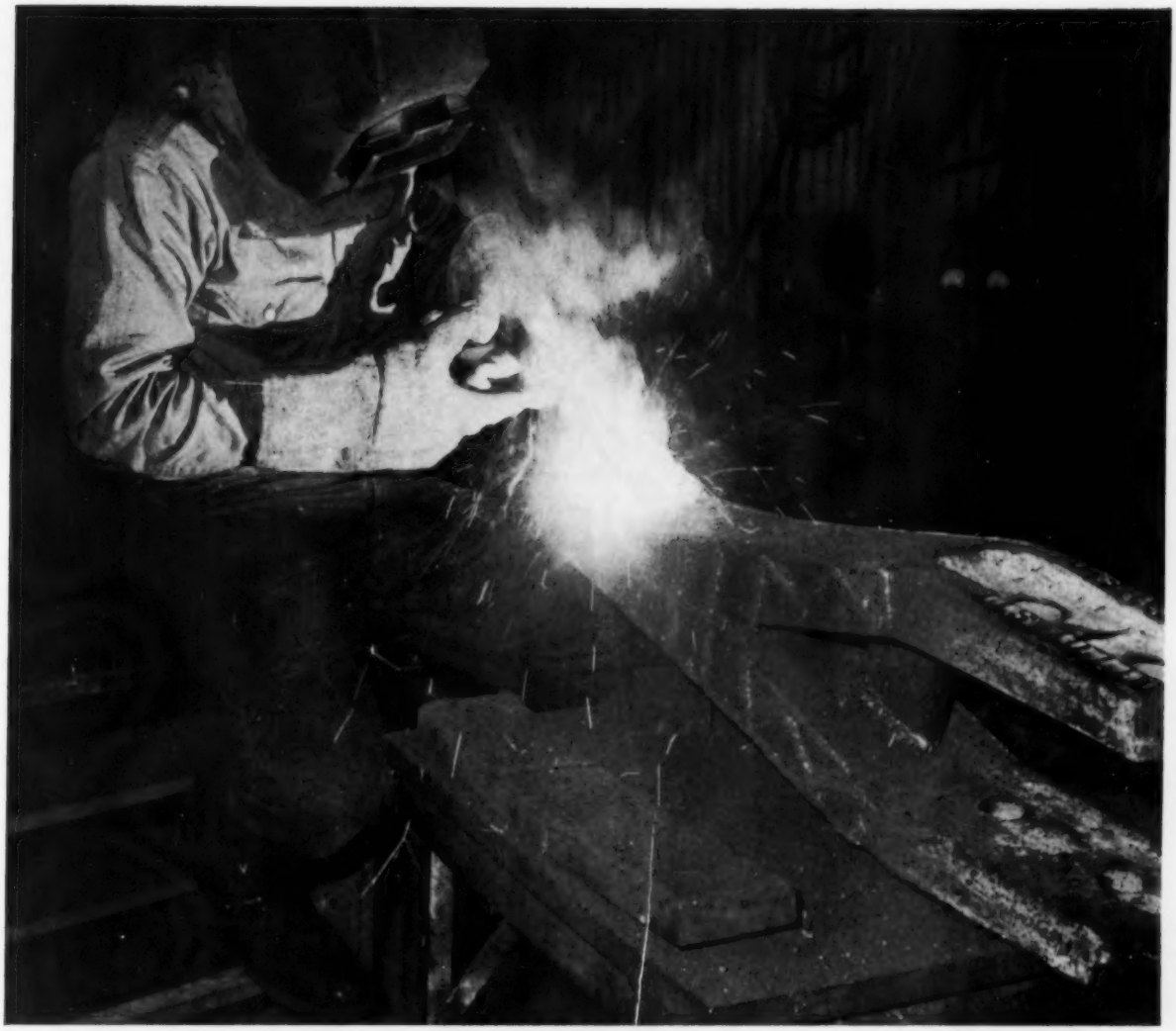
R. H. Forsyth

he was made assistant district sales manager, and in 1951 he was appointed district sales manager, the position he relinquishes to assume his new duties.

Succeeding Mr. Stuntz as manager of the Chicago district sales office is ROBERT H. FORSYTH, who was formerly assigned to the Pittsburgh district sales office.

Promotion of GERALD L. BOURDAGES to the position of sales promotion manager was announced by the International Research and Development Corporation, Columbus, Ohio. Mr. Bourdages will direct public relations and advertising for the firm.

The Construction Machinery Division of the Clark Equipment Company, Benton Harbor, Mich., has appointed Ralph Hall as field service representative for the *Michigan* line in Pennsylvania, Ohio, Virginia, West Virginia, and Kentucky.



Have you tried SEMI-AUTOMATIC HARD-FACING with STOODY WIRES?

Semi-automatic hard-facing is fast taking hold in all industry! Here's a process that *removes much of the labor of welding* and is 2 to 4 times *faster* than manual application. Weldors can see the weld—wires are fed bare; no submerging flux or flux dams are required. Welding is continuous, feeding from layer wound coils...no stub ends, no lost time changing electrodes. With higher speed there is lower heat input, less penetration of the base metal and reduced dilution of deposits...hence higher wear resistance than with manual electrodes of similar analysis.

WHAT CAN YOU HARD-FACE SEMI-AUTOMATICALLY?

Virtually all large parts now hard-faced manually ...crusher rolls, mill hammers, impact crusher rotors, shovel and tractor parts, tool joints, dredge pump impellers and casings, muller tires, etc.

ASK FOR DEMONSTRATION—Most Stoody distributors (check the yellow pages of your phone book) are equipped to demonstrate Stoody Semi-Automatic Hard-Facing *right on your job!* Ask your distributor to arrange a demonstration today!

STOODY SEMI-AUTOMATIC WIRES—Now available in 11 types for *maximum* wear resistance under *every* wear condition!

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Three regional Construction Equipment Distributor Advisory Councils have been created by the national construction equipment distributor group of the Worthington Corporation, Harrison, N. J. Using the slogan "DAC—a two-way street," the councils will provide an opportunity for Worthington to keep informed of distributor reactions to policies and programs which affect them, and will keep the distributors more informed of the multiple facets of the corporation's operations.

The regional organizations will consist of an East Coast group, a Central Region group, and a group from the West Coast. The geographical makeup of each council will be based on areas defined by the Associated Equipment Distributors. Each regional group will meet once a year, with at least two Worthington sales executives taking part.

To tie regional activities together, an annual national DAC meeting will be held, with not less than two distributor representatives from each region attending. Reports of the regional discussions will be submitted to the national group for consideration and action.

At the regional level, all distributor representatives will serve three-year terms. One-third of the membership will be elected every year to maintain continuity of membership for at least two-thirds of the group.

J. D. HARMISON has been named sales manager, Material Handling, Buda Division, Allis-Chalmers Manufacturing Company, Milwaukee, Wis. Mr. Harmison was previously manager, parts sales, for the Tractor Group.

Mr. Harmison joined the company at its Peoria, Ill., branch, in 1939. He was transferred to the home office in Milwaukee in 1951, and became tractor sales manager, Farm Equipment Division, in 1952.

J. D. Harmison

L. W. Darling

In his new capacity as general sales manager of the Davey Compressor Company, Kent, Ohio, L. W. DARLING will direct the activities of 12 district offices and more than 150 direct factory distributors, and will supervise sales of the three Davey operating divisions.

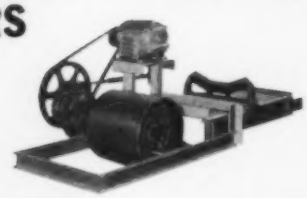
Mr. Darling has been affiliated with Davey for the last 12 years. He was formerly assistant vice-president, a position he will retain in addition to his new duties. His Davey experience also includes service as manager of government sales, midwestern district manager in charge of the company's Chicago office, and New England district manager.

The Lincoln Electric Company, Cleveland, Ohio, has assigned PAUL MCGONIGLE, RICHARD R. GOULD, and JERRY WEISS to its district offices at Boston, Mass., Pittsburgh, Pa., and Detroit, Mich., respectively.

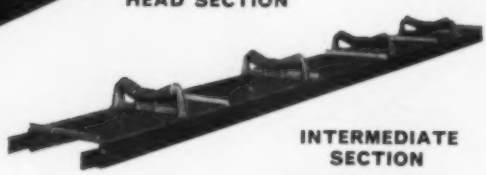
J. FRANK GREELEY, general manager of multiwall paper bag sales, and CHARLES H. BURNS, controller, have been elected vice-presidents of the Fulton Bag & Cotton Mills, New Orleans, La.

TRANSALL® Endless-Economy BELT CONVEYORS

ASSEMBLE EASILY, RAPIDLY TO FIT ANY SIZE JOB



HEAD SECTION



INTERMEDIATE SECTION

TAIL SECTION

NO LUBRICATION COSTS... FACTORY PRELUBRICATED FOR LIFE

SAVE TIME AND EFFORT

At your site, assemble any length conveyor needed . . . rapidly and easily. Simply connect desired number of intermediate sections to head and tail section . . . easily lengthened, shortened or moved. Conveyor sections are available in either channel type (illustrated here) or truss type.

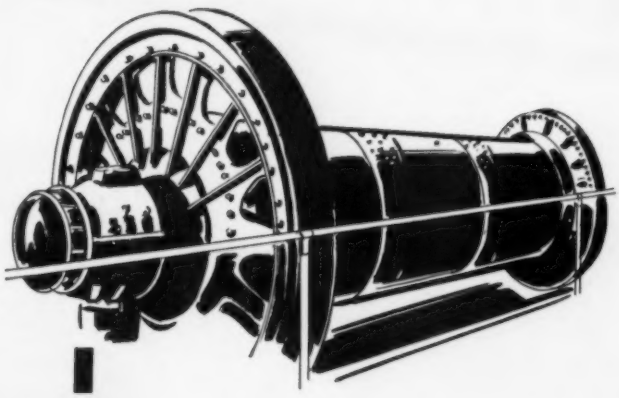
CUT MAINTENANCE COSTS! Factory prelubricated Transall heavy duty, Tran-Seal Idlers do not require re-lubrication. For free illustrated folder 915A, giving full information, write or wire TRANSALL, INC., P. O. Box 1588, Birmingham, Alabama.

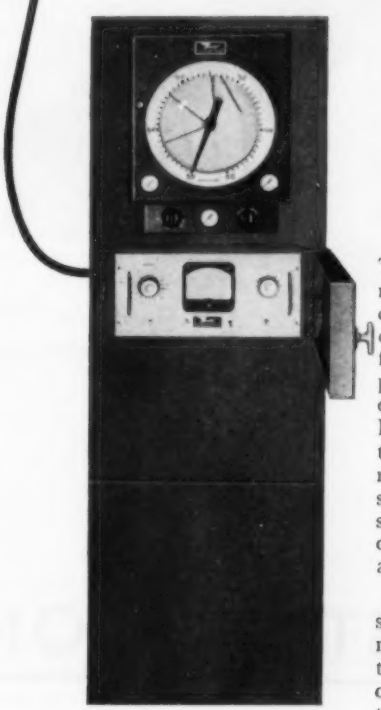
TRANSLATING MORE EXPERIENCE INTO GREATER ECONOMY FOR YOU.

TRANSALL, INC. 109 No. 11th Street • P. O. Box 1588 BIRMINGHAM, ALA.

Enter 224 on card, page 167

SLURRY CONTROL





BENDIX NUCLEAR DENSITY GAGE AUTOMATICALLY CONTROLS SP. GR.† OF FEED SLURRIES

†*Specific Gravity*

The fluid content of your slurry can mean the difference between profitable optimum control and costly borderline operation. Down time due to pump failures can be drastically reduced and plugged equipment can be virtually eliminated with the Bendix* Nuclear Density Gage. In processes using kilns to remove water, fuel savings can be realized; where efficient recovery of solids from flue gas or optimum ore separation by Specific Gravity is desired, the Gage can be readily adapted.

Bendix Nuclear Density Gage assures successful processing in metals mining and non-metals mining operations. Control of the fluid or solids content of your slurry can be maintained precisely at any desired point. The measuring element does not contact the slurry, therefore abrasive and corrosive processes can be handled with ease. Control is continuous and automatic.

A complete and accurate record of Specific Gravity is provided as rapidly as the process changes occur. Inadequate sampling techniques and "post mortem" laboratory analyses need no longer be tolerated.

- **Applications: Wet slurries in ball mills, rod mills, flue gas recovery systems, dust collectors, flotation, classifiers, thickeners, etc.**

Bendix furnishes consulting service for every installation. Write for full details to Cincinnati Division, Dept. 430, 3130 Wasson Road, Cincinnati 8, Ohio.

*REG. U.S. PAT. OFF.

Export Sales:
Bendix International, 205 E. 42nd St., N. Y. 17, N. Y.
Canada: Computing Devices of Canada, Ltd., Box 508, Ottawa 4, Ont.

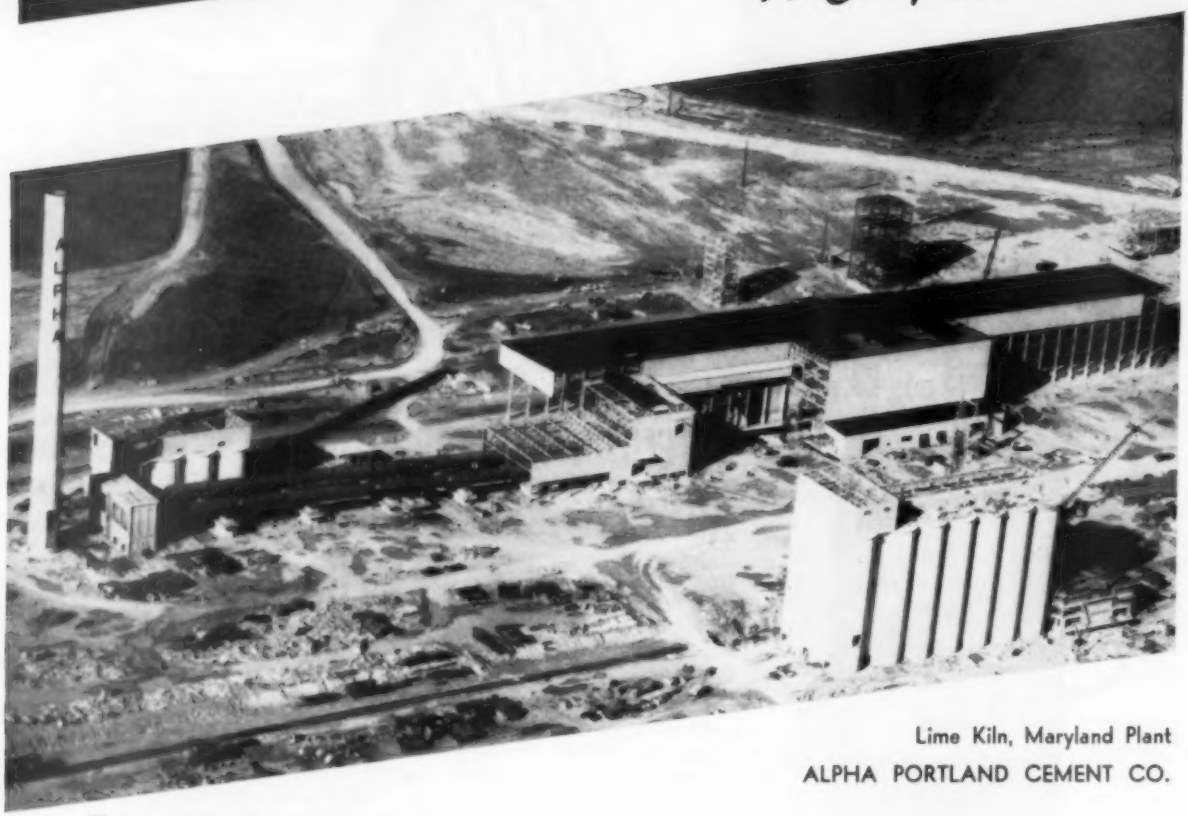
Cincinnati Division

Bendix
AVIATION CORPORATION

"From Alpha to Omega"

MACDONALD

A Complete Service



Lime Kiln, Maryland Plant
ALPHA PORTLAND CEMENT CO.

LAYOUT
DESIGN
CONSTRUCTION

MACDONALD ENGINEERING CO.

Constructing Engineers

885 Bryant Street
San Francisco, Calif.

22 West Madison St. • Chicago

2349 Yonge St.
Toronto, Canada

Enter 226 on card, page 167
226

T. W. Brown Jr.

P. Williams

Two top positions in the Multiwall Bag Division of the Owens-Illinois Glass Company, Toledo, Ohio, have been filled with the appointment of T. W. BROWN JR. as general sales manager and PHILIP WILLIAMS as assistant sales manager.

Mr. Brown became associated with O-I in 1953, when the National Container Corporation, for which he was southern sales manager, merged into Owens-Illinois. Until his recent promotion, he served as sales manager of the Multiwall Bag Division's southern district, with headquarters in Mobile, Ala.

Mr. Williams, who joined Owens-Illinois in 1956, was formerly sales promotion manager of the Multiwall Bag Division. He will retain his promotion duties in his new position, and will have particular responsibility for the direction of sales in the division's central sales district.

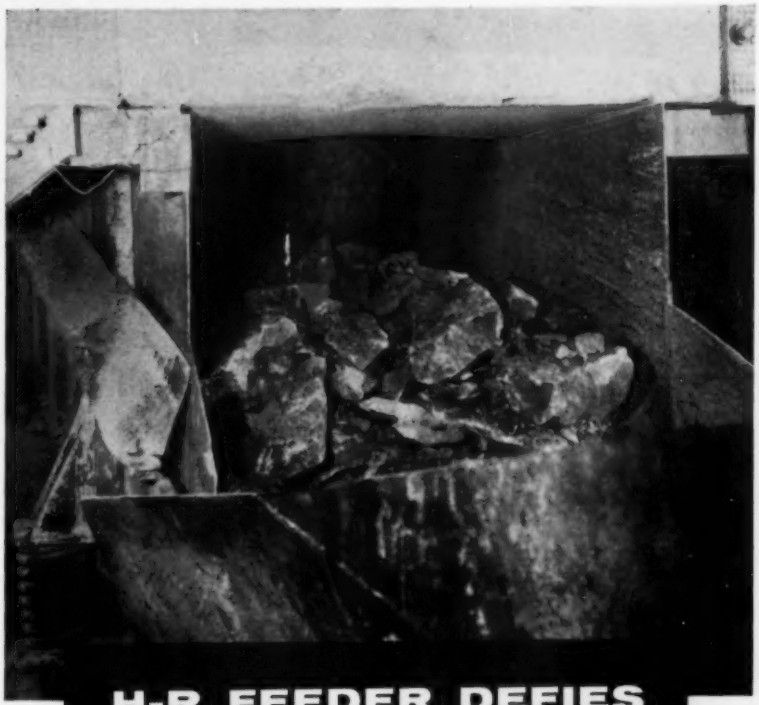
Officials of the Cummins Engine Company, Columbus, Ind., announce the promotion of four men to new positions.

R. F. DAVIS, formerly regional manager, eastern, has been named manager—fleet sales. In his new position, he is responsible for the sales of Cummins diesel engines to fleet accounts in the eastern half of the United States.

B. K. JACOBS succeeds Mr. Davis as regional manager, eastern, transferring from the company's Great Lakes regional office in Cleveland, Ohio.

T. J. PAXTON assumes the new post of manager, distribution, western, and is headquartered at the company's factory in Columbus, Ind. In his new capacity, he is responsible for activities of the Cummins regional offices in the western half of the United States and the Cummins distributors in that area.

Mr. Paxton is succeeded in his former position of regional manager of the Rocky Mountain regional office in Denver, Colo., by J. E. GRIMMER. Mr. Grimmer was previously representative in the central regional office in Chicago, Ill.



H-R FEEDER DEFIES 4 MILLION TON 3 YEAR BATTERING

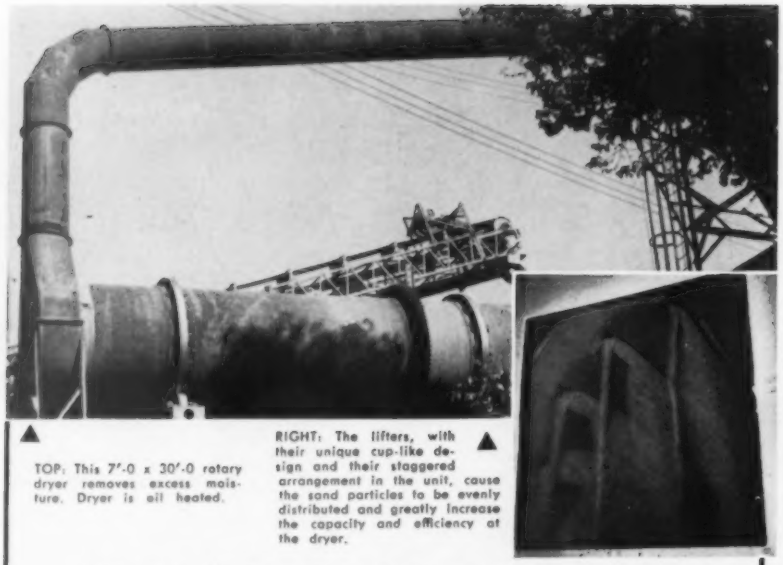
This Hewitt-Robins extra heavy duty vibrating feeder has handled, at 500-550 TPH, 4 million tons of minus 24 in. crushed rock—rock which has fallen 9 ft. from a primary crusher to the 2 in. thick feeder deck which, after more than three full seasons, shows absolutely no sag and less than ¼ in. of wear. Maintenance costs? Only routine lubrication and one change of V-belts. What's more, this H-R feeder has paid for itself in conveyor belt savings in three years.

This rugged performer is available with long-wearing, special non-plugging grizzly decks to handle the most slivery material; stainless or alloy steel pans for extremely sticky materials; heavy, abrasion-resistant steel liners; and special extremely heavy pan construction for heaviest impact. This means added performance and economy to your operation, whether you handle material in lumps up to 3 or 4 ft. cubed, sticky material, such as wet iron ore, or exceptionally abrasive materials, as coke and sinter. To find out how H-R products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut.

HR **HEWITT-ROBINS**

VIBRATING CONVEYORS, SCREENS & SHAKEOUTS . . . CONVEYOR BELTING AND IDLERS . . . POWER TRANSMISSION DRIVES . . . INDUSTRIAL HOSE

Enter 227 on card, page 167



TOP: This 7'-0 x 30'-0 rotary dryer removes excess moisture. Dryer is oil heated.

RIGHT: The lifters, with their unique cup-like design and their staggered arrangement in the unit, cause the sand particles to be evenly distributed and greatly increase the capacity and efficiency of the dryer.

A McDermott Dryer Installation at the North American Refractories Plant at Little Gap, Pa.

Sound Engineering Economy and Consistently Superior Performance Are Built Into All McDermott

Dryers • Coolers • Kilns

McDERMOTT BROS. CO.

Allentown Pennsylvania

Phone HEMLOCK 3-3231

Enter 228-A on card, page 167

Arcair Cuts Repair Cost on World's Biggest Shovel

HERE'S HOW . . . Arcair torches and Copperclad electrodes have cut maintenance costs substantially on The Mountaineer. Speeding hard surface removal on manganese and high-carbon pads, chains, bucket lips, teeth and sprockets, Arcair does the job 10 times faster than former grinding or chiseling methods.

With surfaces Arcair-clean and Arcair-smooth, welders find re-surfacing or other maintenance welding on The Mountaineer an easier, faster job with better fusion to the parent metal.

Torch technique takes only 15 minutes to learn. Basic simplicity—electric arc plus ordinary compressed air—makes the patented Arcair torch, with Arcair Copperclad electrodes, the new, efficient, money-saving answer to most metal removing problems.

SEE ARCAIR Feb. 17-19, Booth #26, NATIONAL CRUSHED STONE SHOW

Arcair Metal Removal Torches

467 S. Mt. Pleasant St., Lancaster, Ohio

Enter 228-B on card, page 167

Kensington Steel Company, Chicago, Ill., announces the appointment of WILBUR E. ELLIS as general sales manager, with headquarters at the main office in Chicago.

Mr. Ellis joined the company's engineering department in 1926, later

W. E. Ellis

J. F. Milmine

becoming chief engineer. In 1948 he joined the sales engineering force, and when the company opened an eastern office in 1952, Mr. Ellis was selected eastern sales manager, the position he held prior to his recent appointment.

JOSEPH F. MILMINE is Kensington's new eastern sales manager, succeeding Mr. Ellis. Mr. Milmine started with Kensington in 1936, and advanced to the engineering department in 1938. In 1952 he was appointed sales engineer and assigned to the southeastern territory, where he later became southeastern sales manager.

P. F. Bauer, managing director, Allis-Chalmers International; E. J. Mercer, general manager, Construction Machinery Division; and William M. Wallace, general manager, General Products Division, were named vice-presidents of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

A. D. Dennis, assistant secretary and assistant treasurer, was elected secretary of the firm.

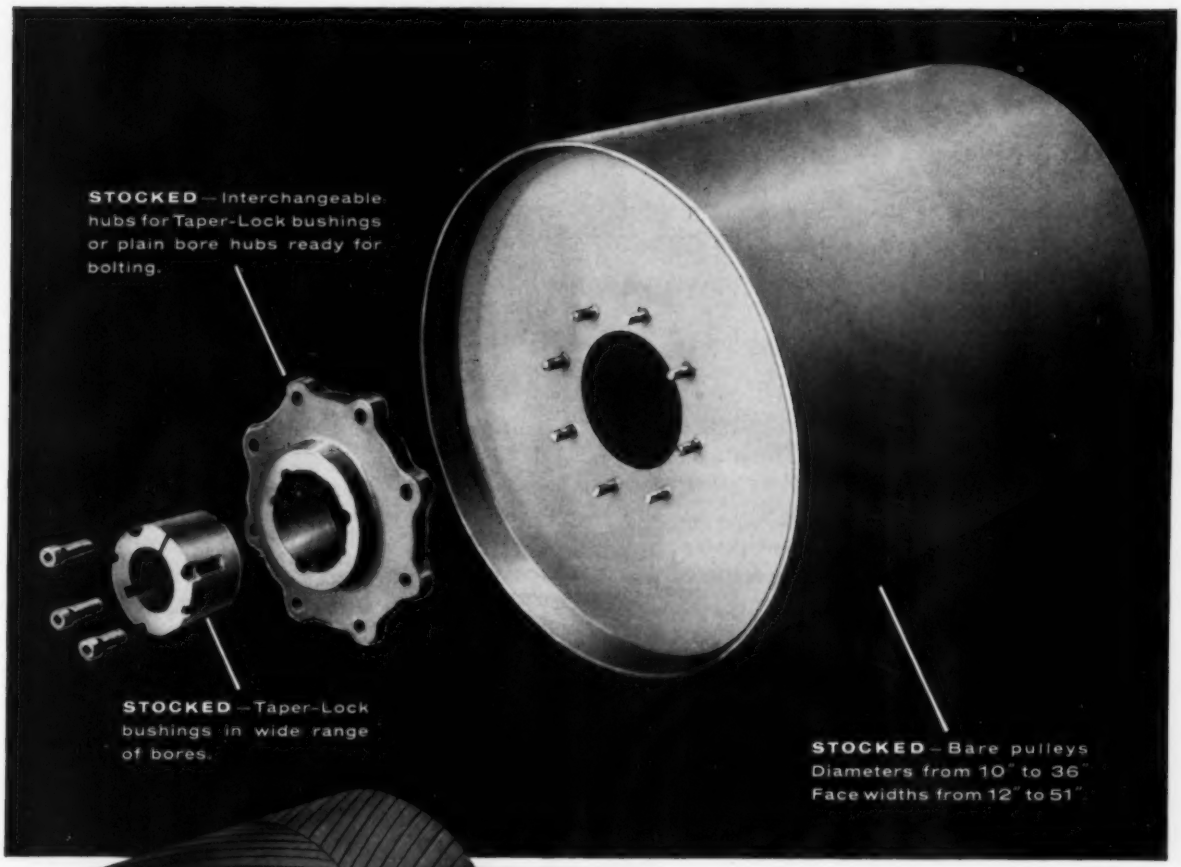
W. C. SCHUMACHER has been elected an executive vice-president and a director of the International Harvester Company, Chicago, Ill. He formerly served as a vice-president of the company and executive head of its motor truck division.

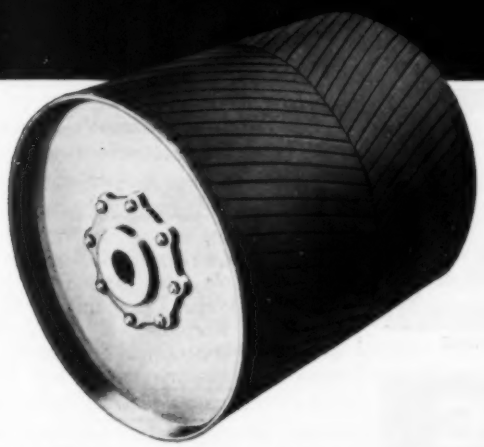
HENRY V. CHASE JR., manager of Hercules Pluto Works at Ishpeming, Mich., was named manager of explosives operations for the Hercules Powder Company, Wilmington, Del.

Complete choice...Immediate delivery

JEFFREY

crown rolled welded steel pulleys


STOCKED—Interchangeable hubs for Taper-Lock bushings or plain bore hubs ready for bolting.
STOCKED—Taper-Lock bushings in wide range of bores.
STOCKED—Bare pulleys Diameters from 10" to 36" Face widths from 12" to 51"

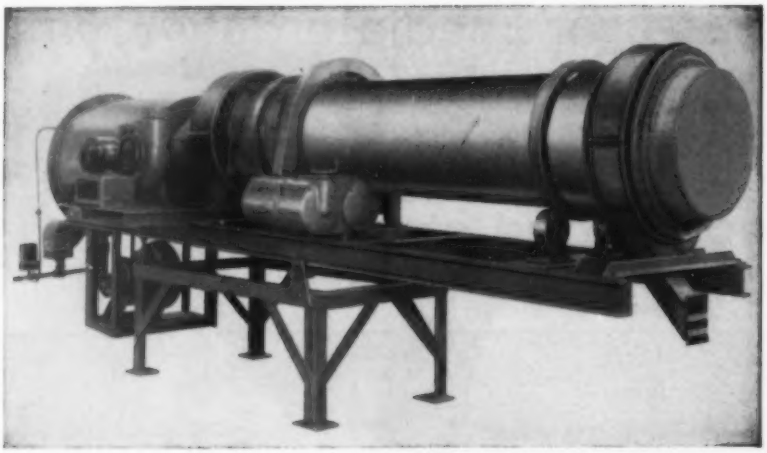


Jeffrey steel pulleys can be furnished with various types of rubber lagging... chevron type is shown above.

For complete details on all types of steel, cast iron and slatted pulleys, write for Catalog 928. The Jeffrey Manufacturing Company, 917 North Fourth Street, Columbus 16, Ohio.

JEFFREY

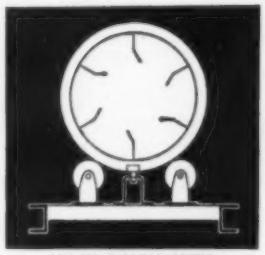
CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING



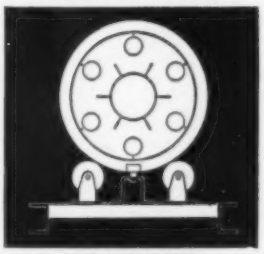
PILOT PLANT ROTARY DRYER

The Ruggles-Coles Pilot Plant Dryer is designed especially for laboratory use or for small capacity unit operations requiring a continuous or intermittent drying step. Each unit:

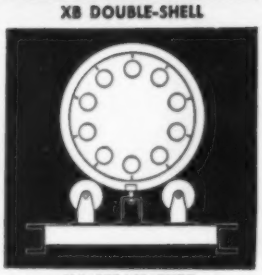
- Is mounted on a structural steel base.
- Has removable "knockers."
- Provides for easy changing of shell rotation speed or shell slope.
- Is available in stainless steel or other corrosion-resistant materials.
- Requires only fuel supply and power connections to be placed in operation.
- Is easily moved from place to place.



XH-XF SINGLE-SHELL



XB DOUBLE-SHELL



XC STEAM TUBE

It is available in three models:

(1) XH-XF single-shell, direct gas fired dryer. Arranged for either parallel or counter-flow operation. Bulletin AH-471.

(2) XB double-shell, indirect-heat, gas-fired dryer for drying without contamination. Volatiles removed with only limited dilution. Bulletin AH-472.

(3) XC steam-tube indirect heat dryer. Can be connected to any available steam supply or furnished with a 3-HP steam generator. Bulletin AH-473.

For complete information write Department 8.

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works

New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco

Enter 230 on card, page 167

The Fuller Manufacturing Company, Transmission Division, Kalamazoo, Mich., announces several changes in personnel responsibilities.

W. E. NINESS, vice-president, formerly in charge of sales, has been moved to a staff position. This change has been made in preparation for his retirement in 1958.

J. A. PACKARD, manager—original equipment sales, has been promoted to the post of general sales manager.

L. C. BUTLER, manager—service sales, has been promoted to assistant to the general manager.

Eagle Iron Works, Des Moines, Iowa, has named L. A. Steinbach to the position of parts and service manager.

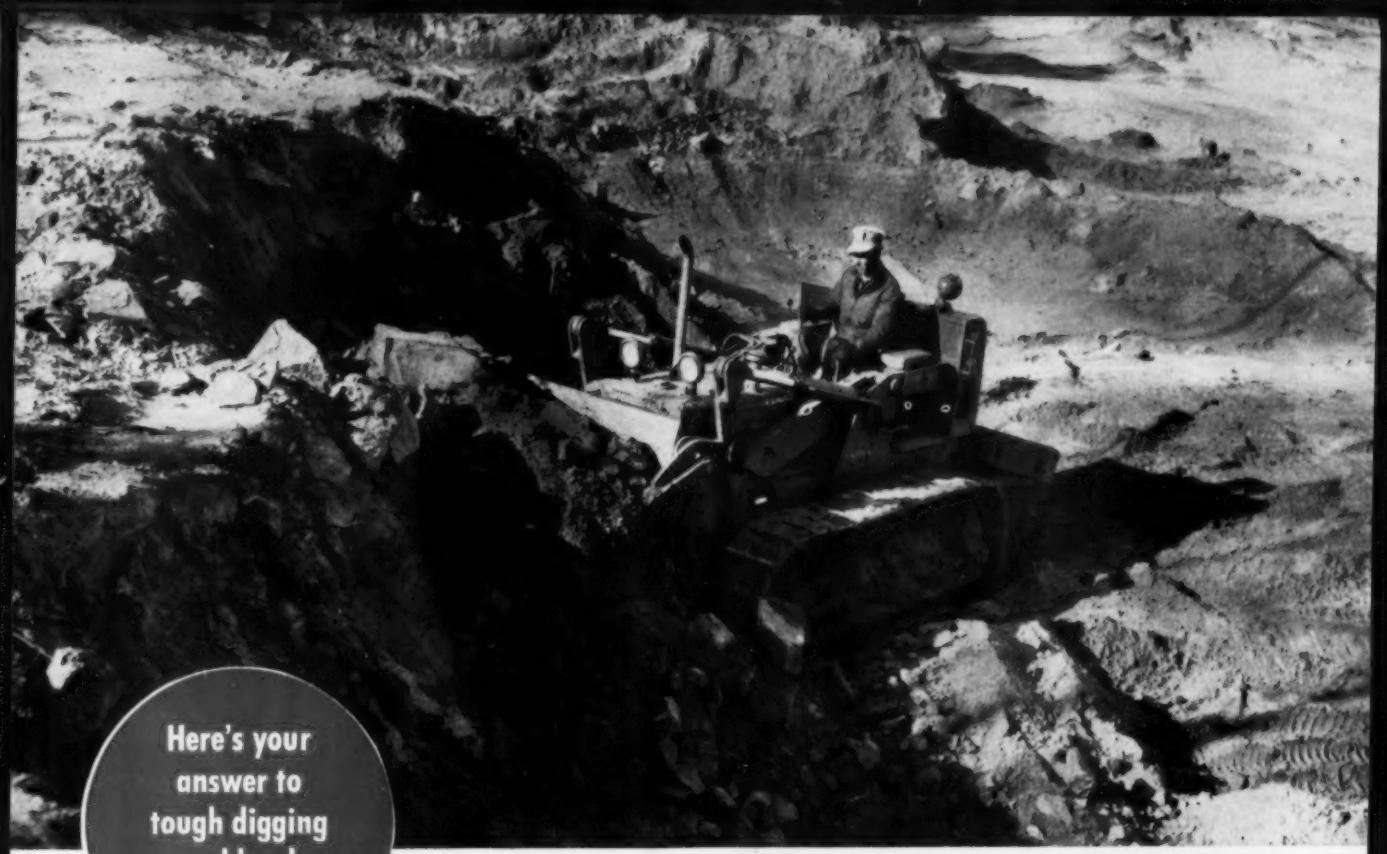
ROBERT A. BEVER has been appointed export sales representative for R. G. LeTourneau, Inc., Longview, Tex.

Mr. Bever came to LeTourneau from Caterpillar Tractor Company, Peoria, Ill. He spent eight years as Caterpillar district representative with the company's Middle East sales and service organization. Immediately prior to joining LeTourneau, Mr. Bever was in the Scandinavian countries, Europe, the Belgian Congo, and South Africa, conducting a survey of the sales potential in those areas.

THEODORE P. MALINOWSKI has been named to the newly-created position of assistant director of product development for the Chemicals Division of the Atlas Powder Company, Wilmington, Del. Mr. Malinowski, formerly development manager in the department, will head up the exploratory field development and marketing research sections of the department.

Denver Equipment Company, Denver, Colo., has appointed the Robert J. Weber Company, 75 Collete Ave., Rochester, N. Y., pump dealer for the northern counties of New York.

FRANK K. PLATT has been named to the newly-created post of central regional manager for all products of the American Air Filter Company, Inc., Louisville, Ky., with headquarters in Detroit, Mich.



Here's your answer to tough digging and hard loading!

Doubling for dynamite, this 4-In-1 is digging and loading "unshot" sandstone material for binder and fill. Holland and Woodward Stone-Gravel Trucking Co., Decatur, Alabama, reports this material formerly had to be "shot"—before previously-used equipment could handle it!

Multiply your job range.... by FOUR
Divide your rig investment by FOUR!

Instead of sinking your capital in an old-fashioned "single-action" loader, let the same money buy four big-capacity International Drott 4-In-1 machine actions!

Instead of allowing profits to dwindle because an ordinary tractor-loader can't do 'dozer, scraper, or clam-shell work, change to a 4-In-1! Move the machine-selector lever, right from the comfortable foam rubber seat, and watch your profit-building potential go up and up!

You aren't getting just "another bucket"—but famous and exclusive Skid-Shovel® rock-busting, pry-action break-out. And 41° bucket-heaping, ground-level roll-back. It's the one and only true pry-action! That means full hydraulic power transfer—correct pry-lever length—and exclusive frame-mounted skid-shoes to provide the vital fixed fulcrum!

And you're also getting easily-controlled, earth-rolling bulldozer action. Plus "carry-type scraper" action to grade, strip, or spread with inch-close accuracy. Plus super-speedy clamshell action, with bottom-dumping to eliminate the sticky materials problem. Plus the exclusive performance protection of shock-swallowing Hydro-Spring!

Invest only 15 boulder-bucking, earth-rolling, load-gulping, sod-stripping minutes! Prove to yourself that an International Drott 4-In-1 multiplies your job range, and divides your investment, by four! Prove you can't afford to handicap your future with any limited-duty rig—when you command this versatility unlimited. See your International Drott Distributor for a 4-In-1 demonstration.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

Enter 231 on card, page 167

New Ringblaster "Muffler" swallows blast noise!

Now . . . firing noise is cut by 60% with this exclusive Winchester-Western kiln gun extra!

This Ringblaster muffler was designed by experts, tested by acoustical engineers and found to reduce kiln gun blasts to a low, safe sound level with normal ear protection. The three-stage baffle built into this muffler reduces loudness by 60% and sound intensity by 75%*. It gives kiln gun operators a measure of sound-safety never before possible.

"A terrific improvement!" . . . "Why wasn't it done before!" . . . these are typical of the many favorable comments made by new users of the quieter, more efficient Ringblaster with its muffler.

And this safety-extra is so compact, it doesn't impair aiming or firing accuracy . . . doesn't block kiln doors—it fits around the heavy-duty Ringblaster barrel, sealing in the sound.

Ringblaster is the *only* kiln gun that comes factory-equipped with a muffler. It also features a short stroke lever for faster firing action. Write for new catalog.

*As tested by an independent laboratory.

RINGBLASTER Kiln Gun

FOR SHELLS, SERVICE OR EQUIPMENT CONTACT
Ramset Fastening System
CLEVELAND 31, OHIO
Made by WINCHESTER-WESTERN DIVISION OLIN MATHIESON CHEMICAL CORPORATION EAST ALTON, ILLINOIS

12175-A Berea Road • Cleveland 11, Ohio

Enter 232 on card, page 167

FRANK POTTS, formerly manager of the Montreal branch of The White Motor Company of Canada Limited, has been appointed assistant to Karl A. Roesch, vice-president of The White Motor Company and general manager of the Autocar Division, Exton, Pa. He succeeds ROBERT G. OAKLEY, who recently became White's branch manager at Cleveland, Ohio.

F. Potts

E. W. Flamme

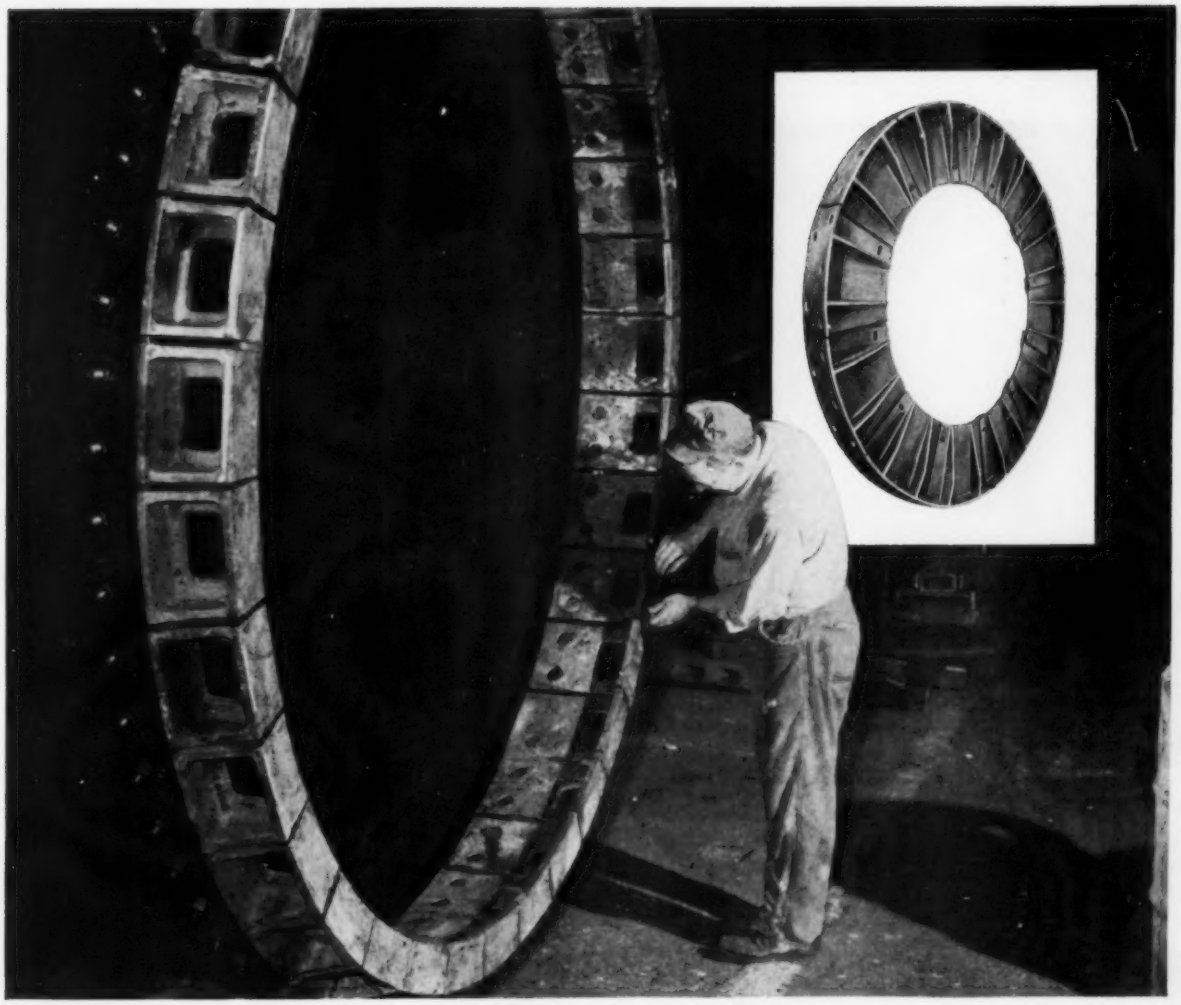
EDWARD W. FLAMME has been named district sales manager of the Portland, Oreg., district sales office of The White Motor Company's Reo Division, Lansing, Mich. The new district office has been opened at 2705 N.W. Nicolai, St., Portland.

Prior to joining Reo, Mr. Flamme was associated with the E. A. Mock Company, a Reo distributor. In 1956 Reo purchased the Mock firm for a factory branch operation, and Mr. Flamme joined Reo as a salesman.

ROBERT N. CONNERS, executive vice-president of the Chase Bag Company, Chicago, Ill., retired on December 31. He continues to serve the firm as a member of the board of directors.

Mr. Conners entered the bag business in 1922 as a salesman for the Northern Bag Company, which merged with Chase in 1925. He served as sales manager and later manager of the firm's Minneapolis branch, and as Midwestern Zone manager. He was elected to the board of directors in 1939, and served as vice-president and general sales manager for Chase before his appointment as executive vice-president in 1953.

The election of J. J. SIEBER as vice-president in charge of sales for the Broderick & Bascom Rope Company, St. Louis, Mo., has been announced. K. B. BRITT succeeds Mr. Sieber in the position of sales manager.



IN CEMENT, LIME, AND DOLOMITE PLANTS...

B&W Nose and Tail-Ring Castings Demonstrate Longer Continuous Service

Longer brick life and longer continuous service are being attained by 275 kilns in 54 plants using B&W Nose and Tail-Ring Castings. In many cases, the life of these castings has exceeded 9 years.

Light and strong B&W Alloy Castings have improved kiln performance in most installations. Made of heat-resisting Grade HH alloy, nose ring castings eliminate belling out of the kiln shell, assuring longer brick life and longer continuous operation of the kiln. By protecting the end of the kiln shell from direct flame, the nose ring castings prevent "feathering-down" of the shell because of oxidation. Their design eliminates cracking and warping, experienced with large size castings.

Small size and light weight make B&W Castings easy and inexpensive to install. The protecting flange on the nose ring castings permits the use of low-alloy steel bolts for fastening.

Spare part inventory may be kept low because the same nose ring castings may be used on kilns varying up to 4 feet in diameter, depending upon size. Write for Bulletin S-17. The Babcock & Wilcox Company, Process Equipment Department, Barberton, Ohio.

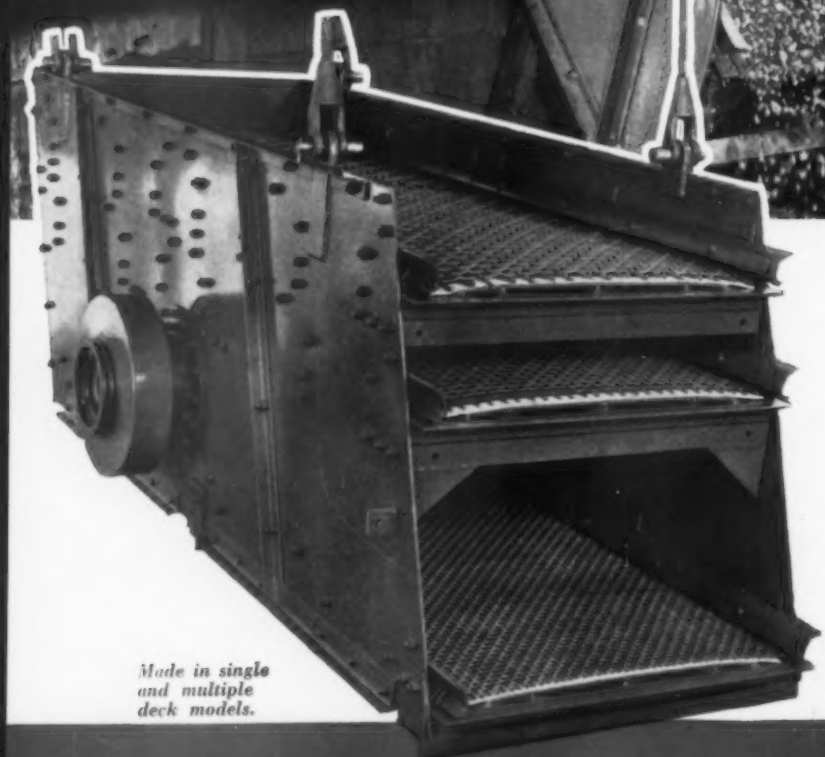
S-467

BABCOCK & WILCOX

BOILER DIVISION

Enter 233 on card, page 167

4 reasons why . . . you'll screen better with



Made in single and multiple deck models.

Setting NEW Standards of Performance for 2 Bearing Vibrating Screens for . . .

SAND • GRAVEL
AG - LIME
CRUSHED STONE
CINDERS • SLAG

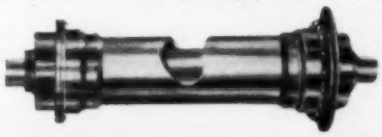
and many other materials

See SECO TWIN-BEARING SCREENS at our exhibit, National Sand and Gravel Show, Booth No. 1, Feb. 10-13, and National Crushed Stone Show, Booth No. 42, Feb. 17-19, HILTON HOTEL, CHICAGO.

For Longer Life

1 20% - 30% HEAVIER AND STRONGER SHAFT

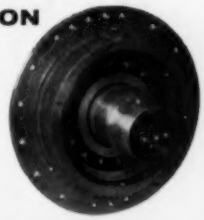
The stout-hearted SECO shaft will stand the gaff under peak loads . . . with an *extra* margin of safety. Heavier, stronger and with correspondingly heavier bearings.



For Longer Life

3 OIL BATH BEARING LUBRICATION

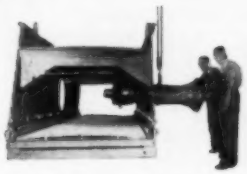
provides more thorough lubrication for longer bearing life. Flinger type seals *keep* the oil confined to the bearing cavity where it belongs . . . for easy starting in any weather.



TWIN-BEARING SCREENS

For Easier Maintenance

2 EASILY REMOVED SHAFT



The entire shaft assembly can be quickly removed for any necessary parts replacement or to allow quick replacement of a complete spare assembly.

U. S. PATENT No. 2751080

4 GREATER SHAFT ECCENTRICITY

For Smoother Performance

and more accurate sizing. SECO design has greatly overcome an inherent characteristic of this design screen, in that there is practically no loss of the required vibration amplitude.

Here is profit-making NEWS for profit-minded producers. Now, SECO, with over 25 years of leadership in the vibrating screen industry . . . offers a complete line of TWIN-BEARING SCREENS . . . with engineering and construction features . . . that are paying-off in high tonnages at lower cost per ton on a wide variety of installations.

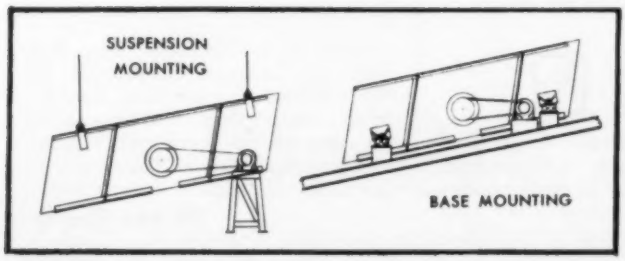
If you're planning new screens for your plant, or a new plant requiring screening, sizing, separating, or de-watering of materials, put these stout-hearted SECO TWIN-BEARING SCREENS to work for you. Get the long life and dependability advantages of the super-duty shaft (20-30% heavier and stronger). Get the advantages of oil bath bearing lubrication and all the other features that make SECO TWIN-BEARING SCREENS first choice for better screening. Why not send your screening problem to SECO today?

SEND FOR BOOKLET TB-21

SCREEN EQUIPMENT CO., Inc.

Buffalo 25, New York

Over 25 Years Leadership in the Manufacturing of Vibrating Screens Exclusively



SECO Twin-Bearing SCREENS

WE CAN TELL YOU...
JUST WHAT YOU'LL FIND

Don't just dig... and hope to find... Call SPRAGUE & HENWOOD, and for a nominal cost you'll know just what Mother Earth holds in store for you. SPRAGUE & HENWOOD's own manufacturing facilities, and more than seventy years of field experience, enables them to obtain the highest percentage of core from almost any formation. From this core you can obtain accurate geologic information . . . no guesswork.

Write to SPRAGUE & HENWOOD, INC. today for an estimate, giving complete information, and it will be on its way to you just as quickly as possible . . . without obligation.

SPRAGUE & HENWOOD, Inc.
SCRANTON 2, PA.

BRANCH OFFICES: NEW YORK • PHILADELPHIA • PITTSBURGH • ATLANTA
BUCHANS, NEWFOUNDLAND • GRAND JUNCTION, COLORADO

Enter 236 on card, page 167

In a realignment of its Mining Division's sales force, the Harnischfeger Corporation, Milwaukee, Wis., has announced the following promotions:

F. J. HIRNER, district manager of Harnischfeger's Chicago office since 1954, and a member of the P&H sales force for 19 years, has been appointed sales manager—electric excavators.

Succeeding Mr. Hirner as district manager of the Chicago office is W. N. RYAN, for the last three years an excavator salesman in the Chicago territory. Assisting Mr. Hirner as assistant sales manager of electric shovels is G. T. RAUBACH.

Other changes include R. B. MAXSON, promoted from excavator salesman to district manager at Buffalo, N. Y., and C. R. MORGAN JR., appointed sales manager, soil stabilizers and Sierra loaders.

In a major expansion of its sales and product operations, the Thor Power Tool Company, Chicago, Ill., has appointed WILLIAM J. MCGRAW general sales manager and WALTER G. MITCHELL general manager of product development, newly-created positions.

Mr. McGraw, who has been electric tool sales manager, will manage all Thor tool divisions in his new capacity. Mr. Mitchell, with 16 years of engineering and design experience at Thor, will integrate engineering operations of all Thor divisions and subsidiaries and will assist all divisions with field engineering problems.

The appointment of ROBERT G. ALLEN as executive vice-president and LEWIS C. BLACK as assistant general sales manager in charge of large machines and blast hole drills has been announced by officials of the Bucyrus-Erie Company, South Milwaukee, Wis.

The Gas Machinery Company, Cleveland, Ohio, has appointed the Oil and Gas Agencies, Ltd., representative in Houston, Tex., and Dynotrol, Inc., distributor in New York, N. Y.

ARTHUR S. HUDSON, who has been an assistant comptroller of the Chrysler Corporation, Detroit, Mich., since 1952, was appointed president of the company's Marine and Industrial Engine Division.

Enter 237 on card, page 167 ➔

You get more Work-ability with "Eucs" in Mines and Quarries

Rear-Dump "Eucs" fit any operation . . . 10, 18, 22, 40 and 50 ton capacities.

Rear-Dump Euclids are built for long life on the toughest jobs. Their simple, rugged construction pays off in less down time for servicing and repairs . . . more work-ability day after day . . . as proved on hundreds of mine, quarry and industrial operations for over twenty years.

There are 5 models with rated payload capacities of 10, 18, 22, 40 and 50 tons. Engines from 128 to a total of 600 h.p. . . . top speeds with full payload up to 36 m.p.h. . . . 5 and 10 speed standard transmission or Torq-matic Drive . . . semi-rigid or spring mounted drive axle . . . standard or quarry type bodies.

Compare Rear-Dump Euclid performance with your present equipment before you replace or add to your hauling fleet. Your Euclid dealer has helpful facts and figures that show how "Eucs" can cut mine and quarry hauling costs and why ***Euclids are your best investment.***

EUCLID DIVISION, GENERAL MOTORS, Cleveland 17, Ohio

Euclid Equipment

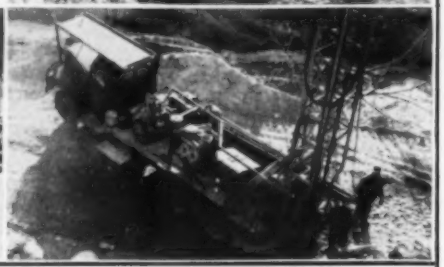
FOR MOVING EARTH, ROCK, COAL AND ORE

cut costs on big quarry jobs!

There's a Davey Rotary Drill to meet every drilling requirement!

DAVEY

ROTARY DRILLS



For faster, more economical drilling . . . increased production at lower cost, leading quarry and open-pit operators rely on Davey. Suitable for mounting on any make of truck, Davey Rotary Drills move fast between blast holes . . . are easy to set in drilling position.

Daveys are available in 8 different models—air blast, mud pump, or combination types. Rated capacities to 3,500 ft. Outstanding features include choice of power take-off or separate power unit operation, automatic hydraulic feed, hydraulic pull down, heavy-duty rotary table, rugged tubular box-type mast.

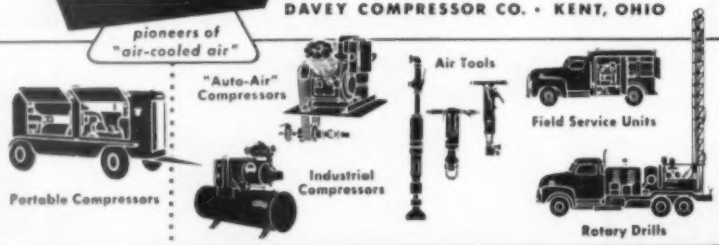
AA-6947

Write for full details!

DAVEY

pioneers of "air-cooled air"

DAVEY COMPRESSOR CO. • KENT, OHIO



Enter 238 on card, page 167

ROBERT F. MILLER is the new advertising manager of the Fuller Company, Catasauqua, Pa., replacing Russell Hawk, who has retired after 22 years with the company.

Mr. Miller joined Fuller in 1954 as assistant advertising manager. He previously had served Yale and Towne Manufacturing Company, Philadelphia, Pa., as assistant manager in the Advertising, Publicity, and Market Research Department.

R. F. Miller

J. C. Bauman

Union Bag—Camp Paper Corporation, New York, N. Y., announces the appointment of J. C. BAUMAN as western district manager of multiwall bag sales, with headquarters in the Chicago, Ill., office.

A member of the Union organization since 1950, Mr. Bauman previously served as a multiwall bag sales representative.

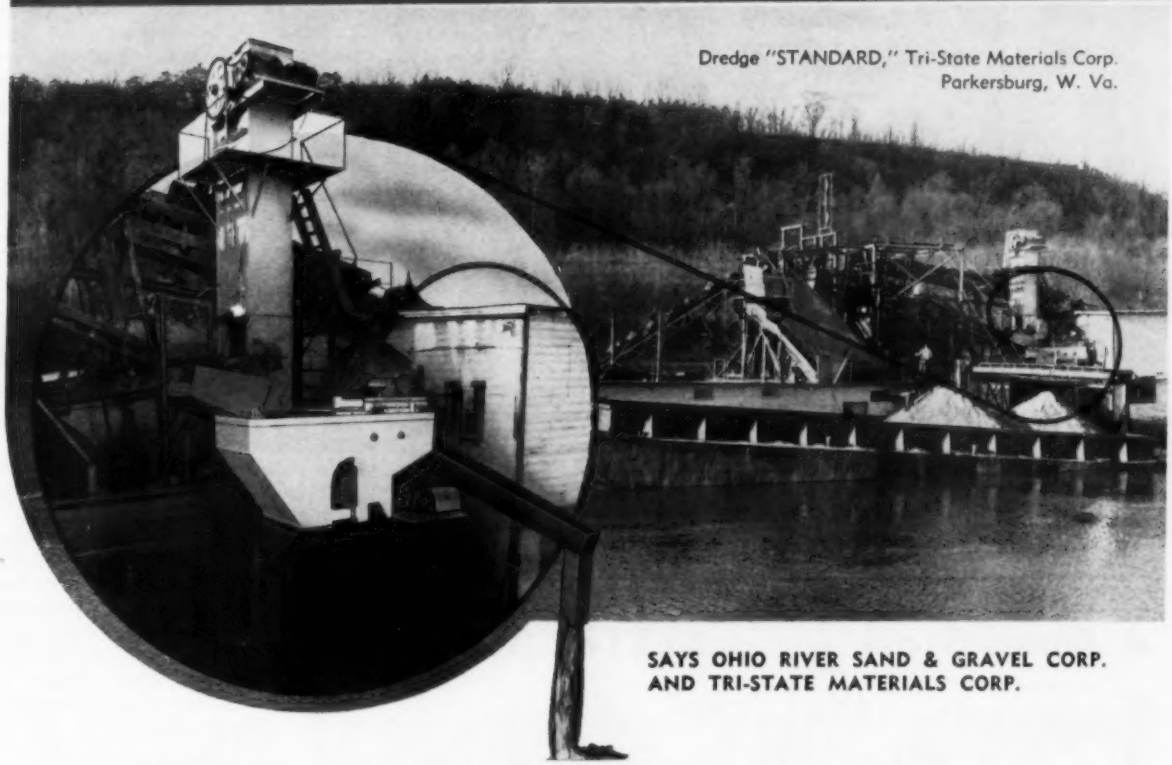
FRANK G. HENSEL has been appointed administrative manager of the Robins Engineers Division of Hewitt-Robins, Inc., Stamford, Conn. Other new promotions include Jack Van Kleunen as manager of engineering sales and Douglas H. Martini as manager of engineering sales service.

ROBERT P. SCHAFER, Penndrill Manufacturing Division, Pennsylvania Drilling Company, Pittsburgh, Pa., has been appointed head of the customers service department.

Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio, has opened a new office and factory parts warehouse at 2356 Irving Blvd., Dallas, Tex., for *Lima* Shovels, cranes, draglines, and the *Lima* Roadpacker.

W. C. Bray Company, Ltd., London, Eng., has entered into an agreement with Sherman Products, Inc., Royal Oak, Mich., for the manufacture of Sherman diggers in Great Britain.

"...The most efficient gravel washer and trash separator yet developed"



Dredge "STANDARD," Tri-State Materials Corp.
Parkersburg, W. Va.

SAYS OHIO RIVER SAND & GRAVEL CORP. AND TRI-STATE MATERIALS CORP.

The OPERATING PERSONNEL & MANAGEMENT state:

"In our opinion, yours is the most efficient gravel washer and trash separator yet developed.

"Requires a minimum of space for installation, maintenance and operation, with the lowest maintenance and operating costs yet.

"Handles our maximum production, regardless of size, with ease."

This scientifically engineered washer can save your Company money, too. Efficiency and low cost join to give profitable production.

This FUEL PROCESS product can readily be installed on your dredge. Our engineers are available to assist you in every possible way. Write for full details so that you can benefit by greater efficiency and lower production costs.

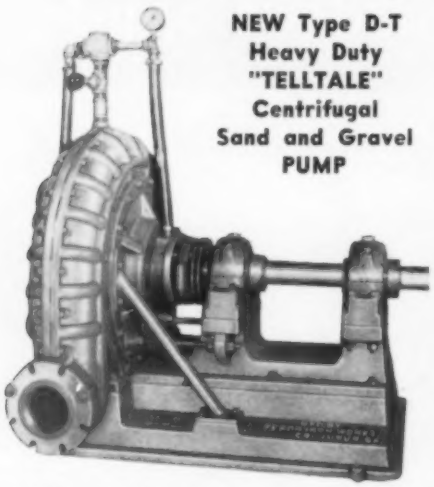
For most installations this unit washes out trash, coal and other extraneous material with water as the separating media—but heavy media can also be used.

FUEL PROCESS COMPANY

"D" at 10th AVE.··· SOUTH CHARLESTON··· WEST VIRGINIA

Enter 239 on card page 167

175-200 YARDS PER HOUR FROM 8x10" NEW TYPE PUMP



NEW Type D-T Heavy Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

"We are amazed at this pump's production," wrote Wilson Brisbois of American Stone Products, Clarkston, Mich., about his 8x10" Type D-T Heavy Duty "Telltale" Pump. "It is from 175 to 200 cubic yards of sand and gravel per hour."

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pump to lose its prime. Pumping stops. Water leaking through the ports signal that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy Duty folder and prices.

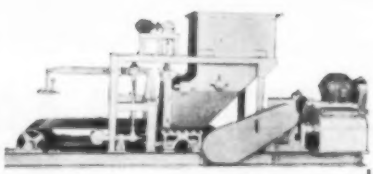
PEKOR IRON WORKS, INC.

LOCK DRAWER 909 — *ESTABLISHED 1892* FAIRFAX 2-4020 — COLUMBUS, GEORGIA

Enter 240-A on card, page 167

A Good Start for a BETTER YEAR!

JANUARY • 1958
MEMO
Order another Schaffer Poidometer



OVER 1500 now serving Industry

WEIGHS • BLENDS • FEEDS • MIXES • RECORDS • PROPORTIONS

There's a safe prediction for the coming year—and years to follow. Production will fairly *hum* in plants where scaling jobs are delegated to the versatile SCHAFFER Poidometer.

This high-speed, automatic, accurate machine supplies weight-data so efficiently that experienced producers consider it "profit-insurance."

Simply designed, rugged and easily operable, the Poidometer gives long, continuous service with minimum labor and maintenance costs.

Poidometers are available with remote control weighing and recording devices, and total weight recorders.

Write for Catalog No. 5

SCHAFFER POIDOMETER CO., 2828 Smallman St., Pittsburgh 22, Pa.

Enter 240-B on card, page 167

Proposed plans for the merger of Dresser Industries, Inc., Dallas, Tex., and the Gardner-Denver Company, Quincy, Ill., have been abandoned, according to an announcement made by Ralph G. Gardner, chairman, and G. V. Leece, president of Gardner-Denver.

Reo Division, The White Motor Company, Lansing, Mich., has announced the appointment of two new district managers.

WILLIAM T. GILES, new district sales manager for the Cincinnati,

W. T. Giles

W. W. Kling

Ohio, district sales office, has been associated with the Reo organization since 1953.

WALTER W. KLING, newly-appointed manager of Reo's Philadelphia, Pa., district sales office, has been with Reo in various posts for 12 years, serving as salesman and assistant to the branch manager for a number of years. Most recently he held the position of sales manager in the Philadelphia area.

J. RUSSELL DUNCAN was elected president, chief executive officer, and a director of the Minneapolis-Moline Company, Minneapolis, Minn., at a recent board meeting. Mr. Duncan's election follows the resignation of HENRY S. REDDIG, president and director.

The Yale & Towne Manufacturing Company, New York, N. Y., has selected the Costello Equipment Company, Ltd., Calgary, Alta., Canada, as distributor for its *Trojan* line of tractor shovels in the province of Alberta.

Completion of a new factory has been announced by the Hoffman Bros. Drilling Company, Punxsutawney, Pa. The newly-enlarged facilities include modern equipment for the production of a widely expanded line of bits for every phase of the drilling, grinding, and finishing fields.

GENERAL MOTORS
GOLDEN MILESTONE
YOU CAN NOW GET ALLISON TORQMATIC TRANSMISSIONS in a complete line of GMC trucks—with V8 or 6-cylinder power—single or tandem axles—conventional or cab-forward models.

GMC Money-Makers available in models from ½ to 45 tons

Now . . . from the pioneer in self-shifting trucks—

GMC Money-Makers with Allison Torqmatic Transmission

HERE IT IS! Now—in trucks for most every need—GMC brings you a completely new, *fully automatic* transmission. It's made by Allison and patterned after the famed units that have proved their mettle in giant off-the-road vehicles for more than a decade.

It's actually a 3-piece "economy package"—eliminating any need for expensive supplementary equipment—

First, you get four driving ranges with six forward speeds. There's a 14.8 to 1 ratio for starting. It feeds just the amount of torque you need for just the load you're carrying and the road you're traveling.

You get a built-in Hydraulic Retarder that supplies effective "engine braking" at the touch of a toe. That makes for far greater safety—especially with big loads.

You get the sure engine and drive-line protection of a torque convertor—but with the fuel economy of a direct-drive lockup that engages in every gear. And two power take-off provisions deliver power through the convertor for smoother, safer operation of your auxiliary equipment.

What's more, you can collect on all these Allison TORQMATIC advantages in any GMC Money-Maker in the 19,500-46,000 GVW range. See your GMC dealer!

GMC TRUCK & COACH
A General Motors Division

GMC—America's Ablest Trucks

NOTHING **TRANSMITS POWER** WITH SUCH **RUGGED** INDIFFERENCE TO ABRASION AS ROEBLING ROYAL BLUE WIRE ROPE. It is an operating quality that helps to make Royal Blue the most widely accepted wire rope in Roebling's history. Other characteristics that make Roebling Royal Blue the choice in many industries are: unique flexibility, shock and corrosion resistance above and beyond the call of duty and an over-all strength that puts new meaning in service life. For details of Royal Blue, contact your local distributor or write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

ROEBLING
ROYAL·1105·BLUE
DESIGN
FOR WIRE ROPE
Its ready adaptability is evident wherever power is transmitted. It conforms to unique design requirements. Use wire rope to transmit power.

NEW RESULTS OF MONSANTO RESEARCH IN USE OF AMMONIUM NITRATE AS AN EXPLOSIVE

Typical shot with Monsanto's new kind of prilled NH_4NO_3

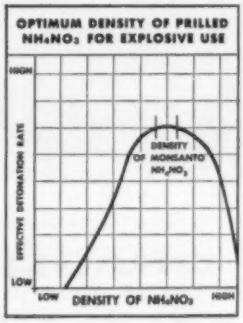
View of area involved in the blast. Shot was made in heavy columnar basalt at dam site. Used as an explosive: a new, top-quality, prilled NH_4NO_3 that Monsanto research developed to give you optimum savings, safety, speed and ease of handling.

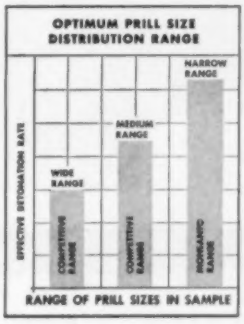
View at time of detonation. The system of detonation recommended by Monsanto, in conjunction with Monsanto Ammonium Nitrate, will yield equivalent pound-for-pound results with 60% gelatin dynamite at one-fourth the cost.

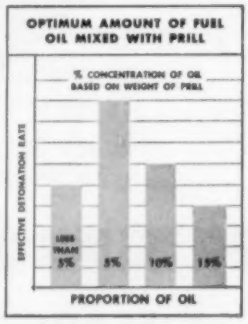
Results of blast. The powder factor in the shot above was 0.4 lbs. per cubic yard. Breakage of rock was considered ideal by contractor. Monsanto's experienced staff can give you complete technical service. Just phone Monsanto.

Photos courtesy of MORRISON-KNUDSEN COMPANY, INC.

Monsanto Ammonium Nitrate is now produced according to the specifications determined by these findings of Monsanto research. Result: more effective blast at greater savings. Monsanto is the world's largest manufacturer of prilled ammonium nitrate—and leader in developing the use of NH_4NO_3 as an explosive for open work. Request report presenting latest research findings.







CALL ST. LOUIS WYdown 3-1000 COLLECT — OR WIRE NOW FOR COMPLETE INFORMATION

MONSANTO CHEMICAL COMPANY
Inorganic Chemicals Division
Dept. F-1, St. Louis 24, Missouri
In Canada: Monsanto Canada Ltd., Montreal

Monsanto®

Where Creative Chemistry Works Wonders For You

Enter 243 on card, page 167

HENDRIX DRAGLINE BUCKETS

...CHANGING THE FACE OF THE EARTH

"A Type for Every Digging Purpose"

¼ to 40 Cubic Yards

All Hendrix Buckets available without perforations

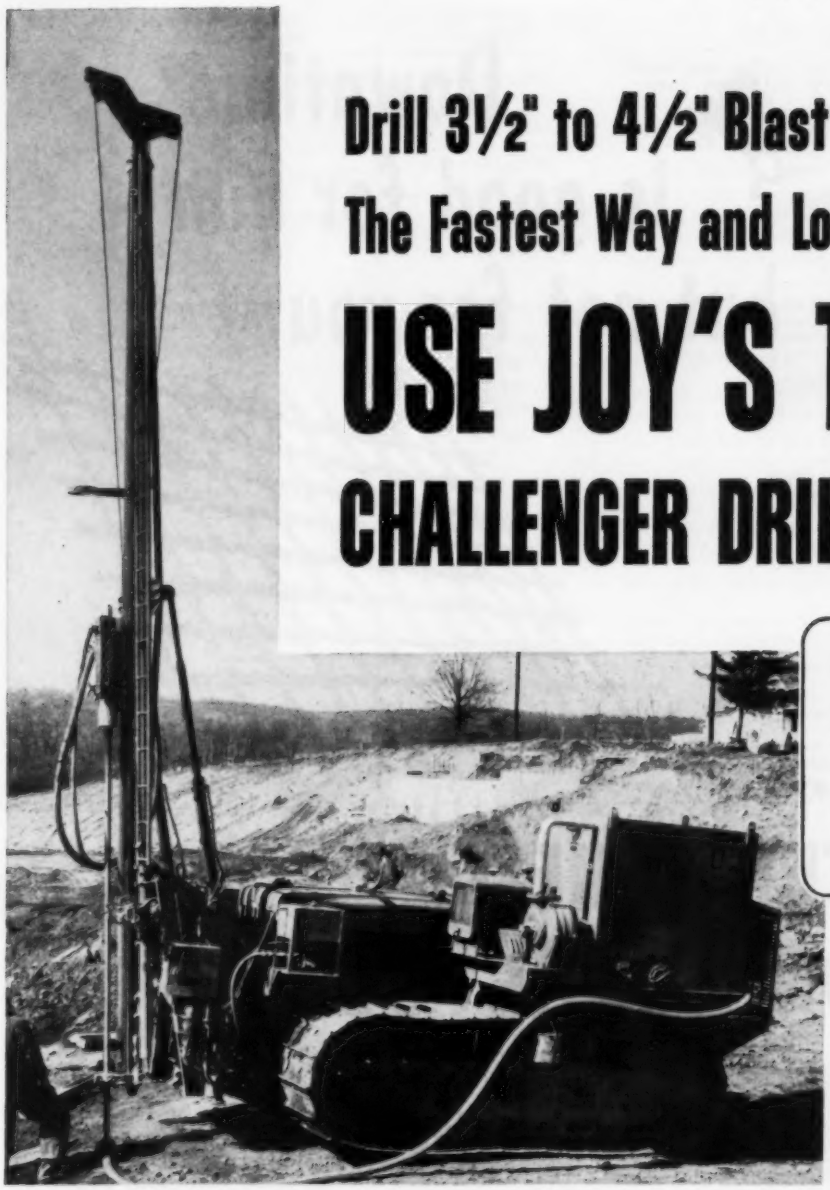
HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA

Hendrix Lightweight Dragline Buckets

Enter 244 on card, page 167

Drill 3½" to 4½" Blast Holes
The Fastest Way and Lower Your Costs
USE JOY'S TWM-3
CHALLENGER DRILL PACKAGE



Easy to mount on a wide variety of chassis . . . drills 3½" to 4½" holes to 50 ft. depth or more

Package consists of:

- **JOY TM-500 DRILL AND MAST**
- **AIR MOTOR-DRIVEN CHAIN FEED**
- **AW-80 AIR WINCH FOR HANDLING STEELS**
- **CONVENIENT MOUNTING BASE AND CLAMPS**

This proven percussion blast-hole drill package, pioneered by Joy, replaces three or four wagon drills . . . *and still boosts the tonnage of broken rock per shift.* The rugged heavyweight drill, the most powerful in its class, sinks 3½" to 4½" holes to depths of 50' faster than any other machine of its type. It fits to a crawler-mounted tractor, truck, or any mobile chassis that will support its weight. You can select used equipment for mounting the rig, keeping initial cost low. Mast and levelling jacks operate from double-acting, hydraulically controlled cylinders. Operating range from 15° to either side of vertical and 15° forward of vertical permits quick setup and hole spotting. Get the specs and full story on this mobile, money-saving rig by writing to ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

WRITE FOR FREE BULLETIN 192-26

JOY... EQUIPMENT FOR CONSTRUCTION . . . FOR ALL INDUSTRY

PORTABLE COMPRESSORS

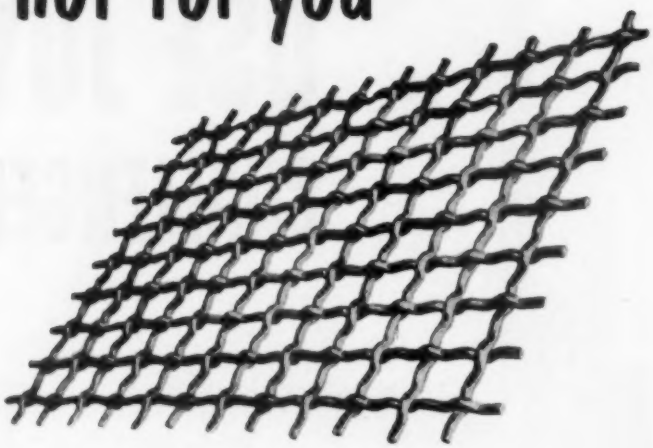
WAGON DRILLS

ROCK DRILL BITS

HAND-HELD ROCK DRILLS

W&W C6774-192

Downtime is good for him — but not for you



use...

SUPER-TEMPERED PRECISION SPACE SCREENS

Here's an abrasion-vibration-fatigue-resistant screening that minimizes downtime . . . even on your most demanding jobs . . . and lets *you* capitalize on uninterrupted production throughout its long service life.

Super-Tempered Screens are made from special super-tempered wire heated red hot; quenched in oil; tempered in molten lead; crimped to precision standards and woven extra tightly on heavy-duty hydraulic looms. The results: extreme hardness and toughness that withstands the severest vibration, and uniform spacing for accurate screening.

* * *

Cut downtime in your operations. Contact our nearest sales office.

CF&I SPACE SCREENS

THE COLORADO FUEL AND IRON CORPORATION

5482-8

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans New York • Philadelphia

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise Butte • Casper • Denver • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City Phoenix • Portland • Pueblo • Salt Lake City • San Antonio • San Francisco • San Leandro • Seattle • Spokane • Wichita

CF&I OFFICES IN CANADA: Montreal • Toronto

CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

Enter 246 on card, page 167

FOR MANUAL APPLICATION

THIS HARD-FACING ROD	FOR THESE CONDITIONS	FOR THIS EQUIPMENT	APPLI-CATION
VICTORTUBE	Severe abrasion	Ripper and ditcher teeth, dredge cutter blades, posthole augers, oil field tools, pug mill knives	ACETY. AC-DC ELEC.
VICTORTUBE BARE-30-DOWN	Severe abrasion	Agricultural tools	ACETY. ONLY
VICTORTUBE "SPECIAL"	Abrasion, severe impact	Oil field bits, rock bits	ACETY. ONLY
VICTOR TUNGSMOOTH	Thin cutting	Augers, bits, blades, screw conveyors, farm tools	ACETY. AC-DC ELEC.
VICTORITE	Earth abrasion, sliding friction	Farm tools, earthmoving rigs	ACETY. AC-DC ELEC.
TUBE VICTORITE	Abrasion, impact	Plow points and farm tools	ACETY. AC-DC ELEC.
VICTORITE 1	Corrosion, heat, abrasion	Chemical and food machinery, arbors, screw conveyors, soaking pit tongs	ACETY. AC-DC ELEC.
VICTORITE 6	Red heat, impact corrosion, abrasion	Forming dies, exhaust valves, cams, steam valves	ACETY. AC-DC ELEC.
VICTORITE 12	Heat, abrasion, impact	Saw blade inserts and other critical applications	ACETY. AC-DC ELEC.
VICTORITE CARBON ARC	High abrasion, thin deposit	Plowshares, lister shares, sweeps	CARB. ARC ACETY.
VICTORALLOY	Abrasion, severe impact	Crushers, dredge pumps and cutters, dipper teeth, tampers, rollers, idlers	ACETY. AC-DC ELEC.
VICTORALLOY #1	High abrasion, medium impact	Bucket lips, rock crushers, muller tires, gyratories	ACETY. AC-DC ELEC.
VICTORALLOY "A"	Angular shock, extreme impact, build-up	Clutch parts, gears, crusher plates, gyratory mantles, build-up for hardfacing	AC-DC ELEC. ONLY
VICTORALLOY "B"	Heavy impact, moderate abrasion	Tractor rollers and sprockets, shovel pads, plates, idlers, etc.	AC-DC ELEC. ONLY
VICTORALLOY "C"	High abrasion, moderate shock and impact	Tractor grousers, pressure rolls, crusher segments, roll crusher teeth	AC-DC ELEC. ONLY
VICTOR MULTI-PASS	Impact, compression, build-up	Drive sprockets and tumblers, rollers, idlers, churn drills, clutch jaws	AC-DC ELEC.

What's proper Victor rod for your hardfacing needs?

THIS CHART GIVES YOU QUICK ANSWER

Use it to select right rods for prolonging operating life of your equipment. You'll be selecting rods that go on quickly and smoothly, thereby saving labor and downtime. Order from your Victor dealer TODAY.

FREE—For more detailed information on how to apply Victor hardfacing alloys to wearing parts, write us NOW for your copy of Victor Hardfacing Manual. It's free.

VICTOR

for hardfacing

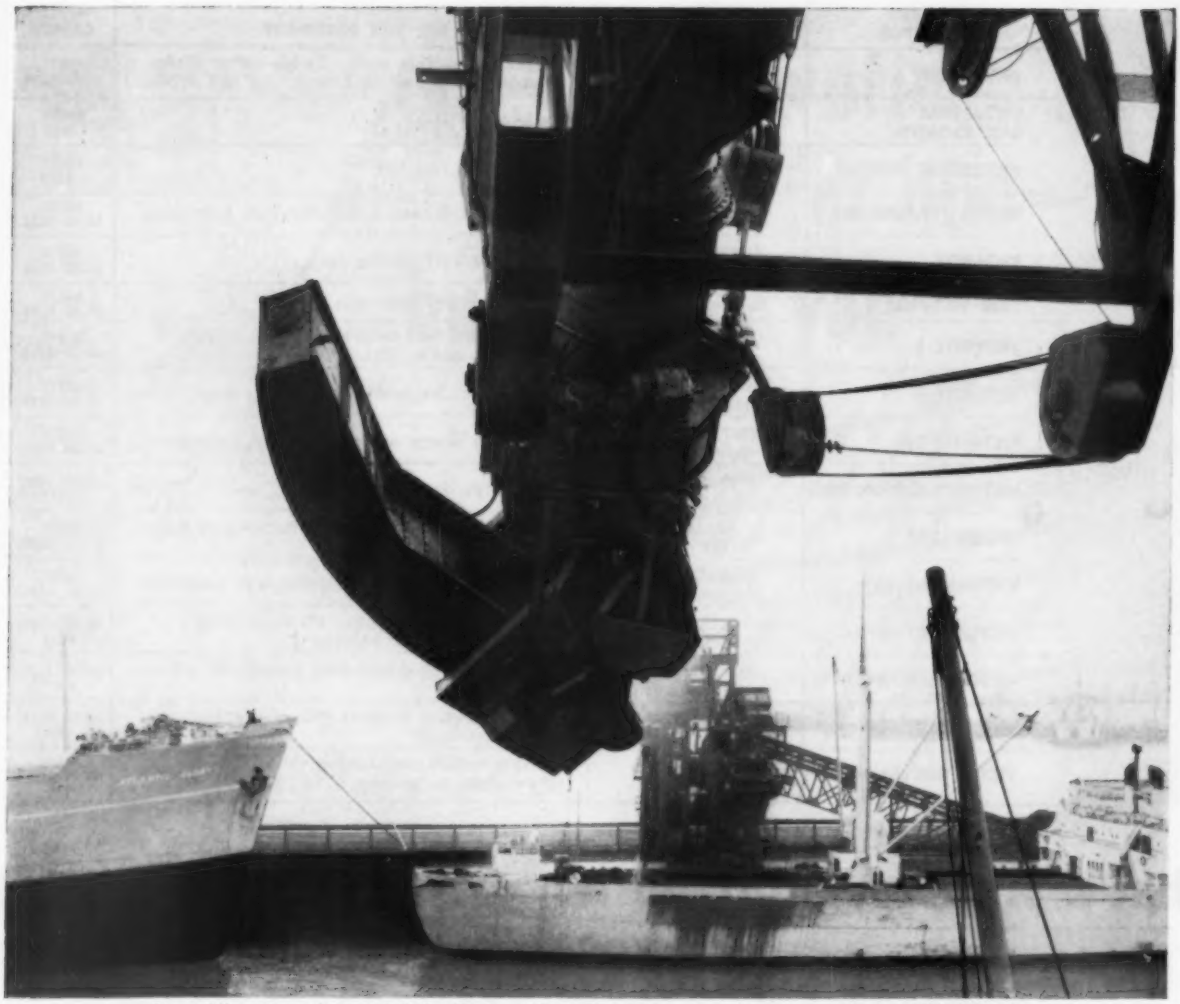
Profitable dealerships open; inquire now!

VICTOR EQUIPMENT COMPANY • *Alloy Rod & Metal Division*

13808 E. Imperial Highway, Norwalk, California . . . . . Wakita, Oklahoma

FOR AUTOMATIC & SEMI-AUTOMATIC APPLICATION

THIS TYPE	FOR THESE CONDITIONS	ON THIS KIND OF EQUIPMENT
#0	High abrasion, medium impact	Crusher rolls, rock crushing equipment
VA #1	Abrasion, medium impact	Crushers, scraper blades
VA #2	Abrasion, impact, Multi-pass application	Steel mill applications, tractor idlers
VA #3	Abrasion, light impact	Mill guides, crushers, dredge bushings
VA #4	Multiple layer build-up	Tractor rollers and idlers, sheave wheels
VA #5	Heavy impact, abrasion	Tractor rollers, idlers, mine car wheels, sheave wheels
VA #6	Medium abrasion, high impact	Crane wheels, drums, roll necks
VA #7	Abrasion, high impact	Build-up for hardfacing, mine car wheels
VA #8	Abrasion, high impact	Roll crushers, scraper and grader blades, tool joints
VT #60	Extreme abrasion	Tool joints, grader blades, scraper blades
Mo-Mn	Manganese build-up	Wherever manganese build-up needed



At world's most modern coal docks, Newport News, Va., C&O uses coal trimmers of Lukens "T-1" Steel.

New Coal Loading Machine is tougher and lighter—made with Lukens "T-1" Steel

TRADEMARK

Tough, weight-saving Lukens "T-1" gives this trimmer added mobility.

When the C&O Railway designed this huge new coal trimmer, they chose Lukens "T-1" steel for its combination of high strength and toughness—plus ready workability. Construction required less steel, produced outstanding abrasion resistance.

Now with stepped up efficiency, this mammoth machine easily and economically deposits 2,000 tons of coal an hour deep in the holds of ships—with a minimum of wear and maintenance.

Whether you handle coal, stone, gravel or metal ores, Lukens "T-1" steel used in areas hardest hit by punishing abrasive impact will save you money, too. It has tripled the life of rock driers. The 321 minimum Brinell quality has been known to outlast previous metals by 18 to 1 in quarry wear plates. Chutes, hoppers, and mine cars are other typical applications.

And Lukens "T-1" steel retains its remarkable toughness at temperatures well below zero. Send for our informative illustrated booklet, "Lukens 'T-1' Steel." Write Manager, Marketing Service, Room 965, Lukens Steel Company, Coatesville, Pennsylvania.

LUKENS

Helping industry choose steels that fit the job

Enter 248 on card, page 167

Hercules Presents

"BLASTING VIBRATIONS ...Cause and Effect"

For the first time, a scientific 16-mm. color movie is available to industrial explosives users to help explain the facts about vibrations from blasting.

The narrator is Dr. L. Don Leet, professor of geology at Harvard University and seismologist in charge of the university's seismograph station, and one of the world's foremost authorities on blasting vibrations. His scholarly but understandable approach to blasting vibrations convincingly demonstrates how the effect of a blast is often less than that of a passing truck, slamming a door, or just walking across a floor.

Perhaps this half-hour educational movie can help you in your community. Prints are available for showing to civic groups and other public gatherings. To borrow a print simply contact your nearest Hercules office.

Explosives Department

HERCULES POWDER COMPANY

INCORPORATED

900 Market Street, Wilmington 99, Delaware

XRG7-7

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Enter 249 on card, page 167

1957 has been a year of contrasts.

Significant advances in technology, the completion of a substantial portion of our program to expand our productive capacity in the U. S. and Canada and the strengthening of our marketing organization are all tangible achievements which will bring us both immediate and long-term benefits. On the other hand, a generally lower activity in new projects coming in has emphasized the narrowing profit margins faced by most businesses and points up our insistence on improving designs, reducing costs and increasing efficiencies.

Abroad, the picture is bright. Our subsidiaries report current high levels of business and there is great optimism for the future. Of particular interest is the success of our newest family member, Dorr-Oliver Pty. Ltd. of Australia, which opened its doors on January 1 of this year and by mid-year had far surpassed expectations. Growth of Dorr-Oliver (India) Ltd., another of our newer associates, has also been noteworthy, with the recent addition of local manufacturing facilities justifying still greater optimism.

SUGAR — In 1957 a total of 42 RapiDorr Clarifiers and 48 Oliver-Campbell Cane Mud Filters were sold to the cane sugar industry. A significant aspect of this outstanding record has been the increasing participation of our subsidiaries and representatives abroad. They are locally manufacturing, in some instances for the first time, 31 of these machines in Argentina, Brazil, England, France, Germany, India, the Philippines and South Africa.

POLYETHYLENE — The first Merco Pressure Centrifuges went into operation early last year removing catalyst from liquid polyethylene at capacities considerably in excess of original expectations. Overseas, British, Italian and German producers ordered Pressure Centrifuges for similar application in both new commercial scale and pilot plants.

SANITATION — One of the highlights of the year was D-O activity in the waste water disposal field. Four major new developments — all ideally suited for smaller plants — were introduced. The SpiroVortex System which is a complete treatment process akin to activated sludge, the Degritting Clarifier and Clarigester and the DorrClone Classifier as applied to sewage degritting have already been commercially proven at plants in the western U. S. First installations of the CompleTreator, a package plant to serve a population of 150, are now operating with some 30 additional units scheduled to start up in 1958.

Our subsidiary in the Netherlands has marketed equipment for facilities as far distant as Norway, Iraq and India, while new or enlarged D-O equipped domestic installations sold in 1957 can be found from New York City to Los Angeles and San Antonio, Texas to Fairmont, Minnesota.

GENERAL METALLURGICAL — Applications of the DSM Screen, first introduced in 1956, continued to grow in virtually every field we serve. One of the most promising has been magnetite recovery in heavy media cyclone plants on the Mesabi Range. Also new is the swing-type agitator for the American Filter — a development particularly applicable to filtration of heavy metallurgical slurries.

Following the trend noted in previous years, widespread acceptance of the Slurry Mixer by the cement industry and the Thickener — American Filter combination by the coal industry continued again last year. In Germany, France, India and Australia flue dust clarification and recovery contributed materially to our business and in Canada a substantial volume of Dorr-Oliver-Long shaft equipment and mine cars was purchased for underground mines.

PLANT ENGINEERING—At the year's end, design of a granular fertilizer plant for India and sections of a new Cuban nickel recovery plant were partially completed, and construction of three D-O designed phosphoric acid or fertilizer plants was progressing in Venezuela, England and Montana. During the year a 200,000 ton per year triple superphosphate plant in Florida and a Norwegian phosphoric acid installation were put into operation and brought up to design capacity in near record time.

FLUOSOLIDS SYSTEMS — Also in the fertilizer industry two western producers ordered the first FluoSolids Systems to be used for calcination of phosphate rock. Designed to handle a total of 1,500 tons per day, these installations were the direct result of successful field tests using a portable fluidized bed pilot plant. During the year other FluoSolids Systems were ordered to dry limestone and blast furnace slag in the U. S., roast copper matte in Belgium, calcine clay in Scotland, decompose copperas in England, and roast pyrite for a Japanese paper mill and an Italian sulfuric acid manufacturer.

The largest FluoSolids System for fine coal drying, handling over 600 tons per hour, went into operation during the third quarter at a new eastern preparation plant, and construction is nearing completion on a second similar, but smaller, installation. In the realm of unusual applications is a unit drying a highly-corrosive chlorinated hydrate at an eastern chemical plant.

WATER TREATMENT — In the southwestern United States the DorrClone Classifier has been used with notable success for the desanding of municipal well water supplies. For small plants the PeriFilter System with a single pre-treatment unit and split filter provides economical unitized water treatment.

Major expansions of the Louisville, Kentucky and Fort Worth, Texas treatment facilities will be D-O equipped as will new municipal plants at Springfield, Ohio; Peoria, Illinois; and Delhi, India. New industrial treatment installations will serve pulp mills in South Carolina, India and Venezuela and an Indian fertilizer plant.

PETROLEUM — Another modification of the familiar DorrClone Classifier is the Clay-Jector, latest development for control of drill mud weights. Noteworthy economies are possible using this unit which mechanically rejects undesirable drilled solids while recovering valuable barites for reuse.

CHEMICAL — A substantial amount of D-O equipment of all types has been incorporated into the unique flowsheet of a new astrakanite recovery plant in the Chilean nitrate fields. In Germany and the United States, Horizontal Filters have been widely applied to dewatering and washing of fine organics as well as highly corrosive inorganics, and around the world filters of both standard and special construction were ordered for an almost endless variety of services.

COPPER AND URANIUM—Last year substantial amounts of D-O processing equipment were purchased for new and enlarged copper mills in South America, Mexico, the Belgian Congo and United States and new uranium mills in Australia, United States and Canada. A new and improved design and method of fabrication of stainless steel rake Classifier blades was developed. Although conceived initially for the uranium industry this design is broadly applicable to classifications involving corrosive solutions. Certainly no summary of 1957 accomplishments would be complete without mention of the Chemical Engineering Achievement Award presented last month to a group of companies including Dorr-Oliver for their contribution to extractive metallurgy of atomic age metals. Interestingly enough, D-O was one of the very few engineering equipment organizations selected for the award.

With several years of expansion and enormous activity behind us, the current business plateau provides a much needed opportunity to consolidate and catch our breath. The real challenge will be to increase the spread between income and outgo through more efficient operation — while accelerating the rate of our technological advances. I am confident we can, and will, do both.

J. D. Hitch, Jr.
President

November 18, 1957

DorrClone, FluoSolids, PeriFilter and RapiDorr T.M. Reg. U. S. Pat. Off.

Enter 250 on card, page 167

"Our Bucyrus-Erie 38-B is easy to operate and very cheap to run. We experience very little downtime and have had no serious breakdown. It really stands out for ruggedness, power, and consistent performance," says Lee Courtney, quarry superintendent for Standard Industries, Inc., Aggregate Division, Tulsa, Oklahoma. The 1½-cu. yd. shovel is loading limestone from a 35-ft. ledge in Standard's East Tulsa quarry.

Bucyrus-Erie teamwork satisfies pit owners

Top output plus daily dependability that keeps stripping and loading operations going at a profitable pace shift after shift, year after year — that's why experienced pit owners prefer convertible Bucyrus-Erie excavators. These men recognize excavator quality — simple strong design; durable long life construction; easy smooth operation; and low-cost maintenance.

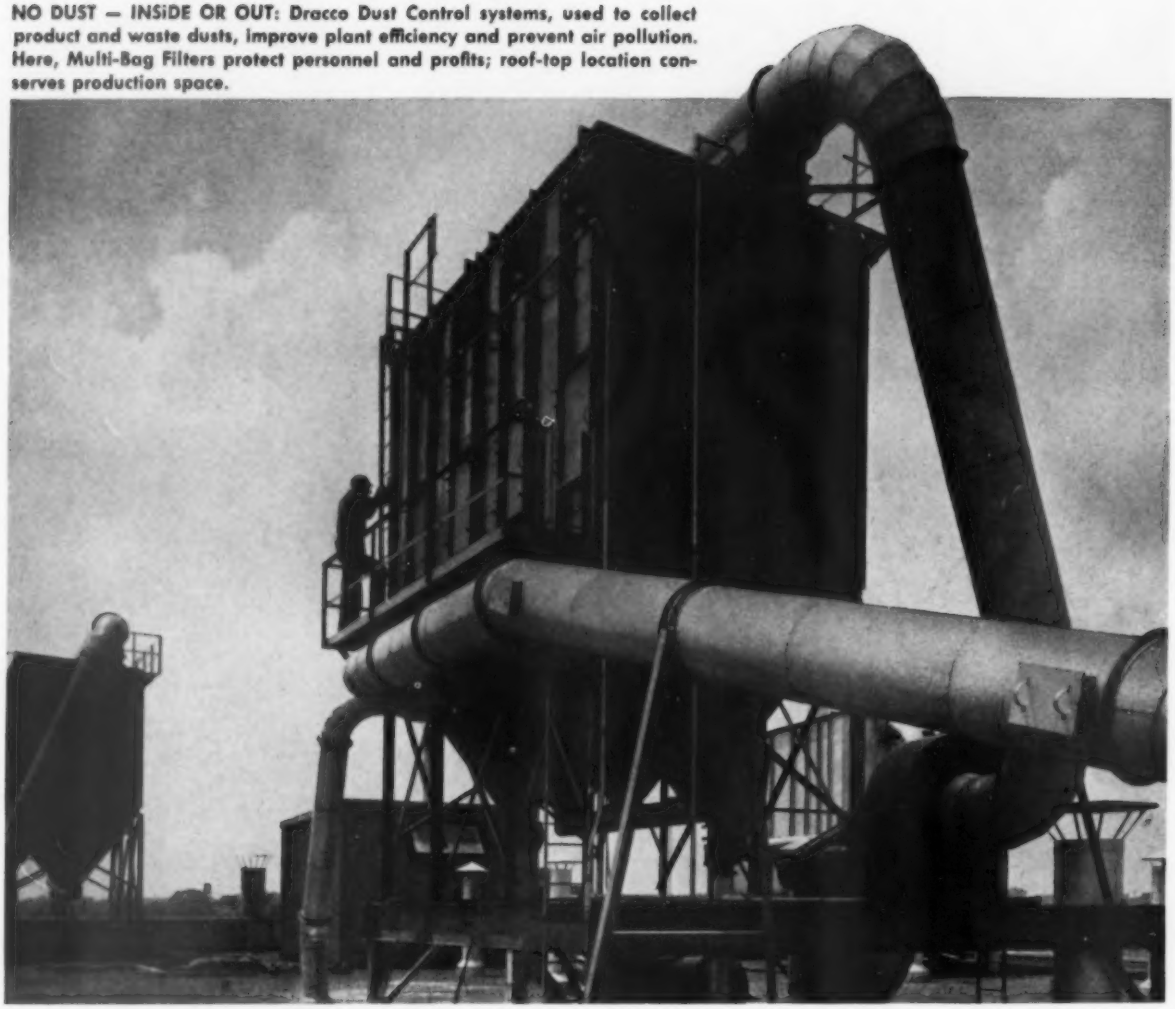
They take full advantage, too, of Bucyrus-Erie's after-the-sale bonus: unmatched prompt, reliable service. Distributor facilities are conveniently located in over 100 cities throughout the United States and Canada. Trained service personnel, factory-approved service equipment, and complete stocks of Bucyrus-Erie parts are available to keep machines in top performing condition.

In shovel and dragline needs, this kind of manufacturing, sales, and service teamwork assures pit owners the best. Drop in soon at the Bucyrus-Erie distributor near YOU — he'll be glad to help you select the right machine for your pit from a range of sizes from ⅜ to 4 cubic yards. For information on larger size machines, write direct. 379E57

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

NO DUST — INSIDE OR OUT: Dracco Dust Control systems, used to collect product and waste dusts, improve plant efficiency and prevent air pollution. Here, Multi-Bag Filters protect personnel and profits; roof-top location conserves production space.



specify Dracco . . . and forget that dust problem

Dust will cease to be a problem, inside or outside your plant, with Dracco Dust Control Equipment on the job. First of all, Dracco Filters trap the dust at its source before it can become a problem. Then, they collect it efficiently and exhaust only clean air with no visible dust. Finally, they keep doing this year after year with only routine preventive maintenance.

This dependability is built into Dracco equipment through—

simplified design—minimum moving parts, standard components, all parts readily accessible and easy-to-change filter bags assure lowest maintenance cost.

custom engineering—each Dracco system is fitted to exact job requirements for maximum efficiency.

proved techniques—Dracco cloth filtration techniques, perfected over the last 40 years, assure the highest collection efficiencies.

accurate fabrication—heavy-gauge metal and quality materials are skillfully converted into rugged units which provide an extra-long service life.

Solving dust and fume problems is a Dracco specialty . . . and has been for over 40 years. This experience can be combined with that of your plant engineering staff to give you better working conditions . . . improved manpower efficiency . . . lower plant cleaning costs . . . reduced machine wear . . . elimination of air pollution. If dust is your problem, you can unload your worries by contacting Dracco today.

DRACCO CORPORATION
4050 East 116th Street • Cleveland 5, Ohio

Complete 40-page catalog on Dracco Dust Control Equipment contains detailed data and valuable reference material. Write for Bulletin 800.

DRACCO *airstream* conveyors
dust control equipment

A SUBSIDIARY OF FULLER COMPANY GENERAL INDUSTRIES

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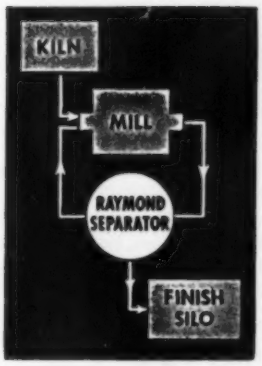
Increase your CEMENT CAPACITY with RAYMOND Whizzer Separation

This is the key unit to economy in your closed circuit grinding operations in making cement clinker or raw mix. By using the *double whizzer* type of Mechanical Air Separator, you can obtain a wide range or control in particle size.

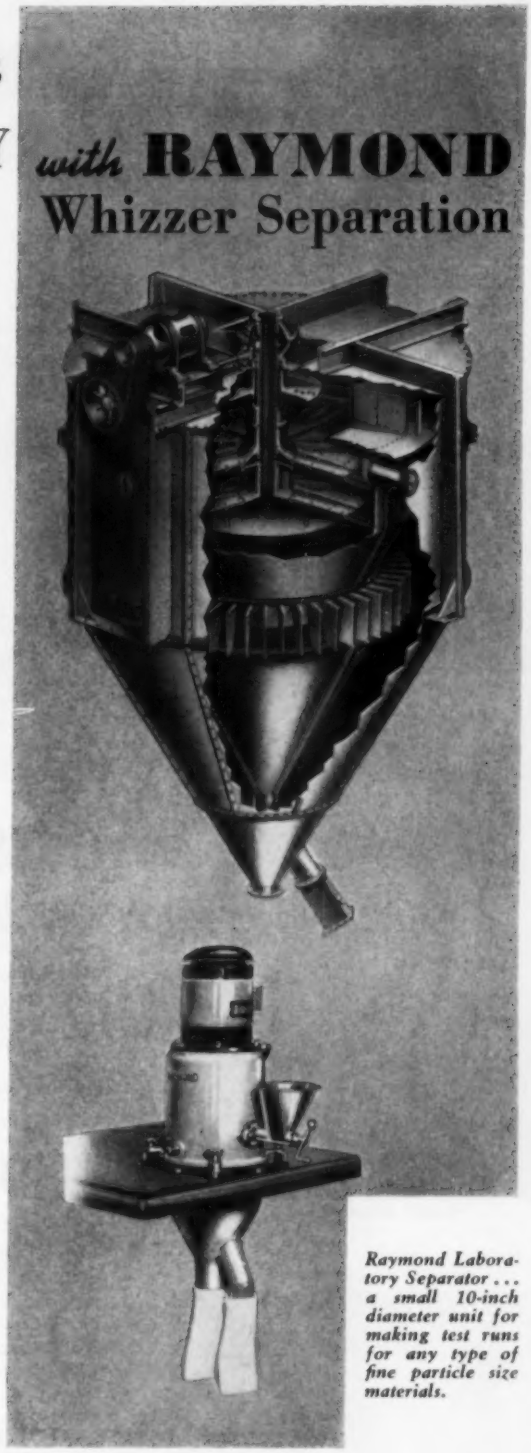
With the grinding mill properly adjusted for the different degrees of fineness desired, you can control the specific surface area, so as to produce either the standard grades or the high early strength cements merely by setting the vertical slide dampers from the outside. When the Separator is used in closed circuit with a mill, the overall capacity of the combined unit is always increased to such an extent that the addition of the Separator, with its power, is more than justified, resulting in extra economies. Capacity increases have varied from 25% to 100% or more, depending on the type of mill and grinding characteristics of the material.

Whether classifying cement, limestone, gypsum, chemicals and a variety of other materials, the Raymond Whizzer Separator is equally effective. It insures close separation of the fines, consistent uniformity and low production costs.



Showing how the Raymond Mechanical Air Separator provides an important link in the closed circuit operation of grinding mills for cement production.

Write for Separator Bulletin No. 76



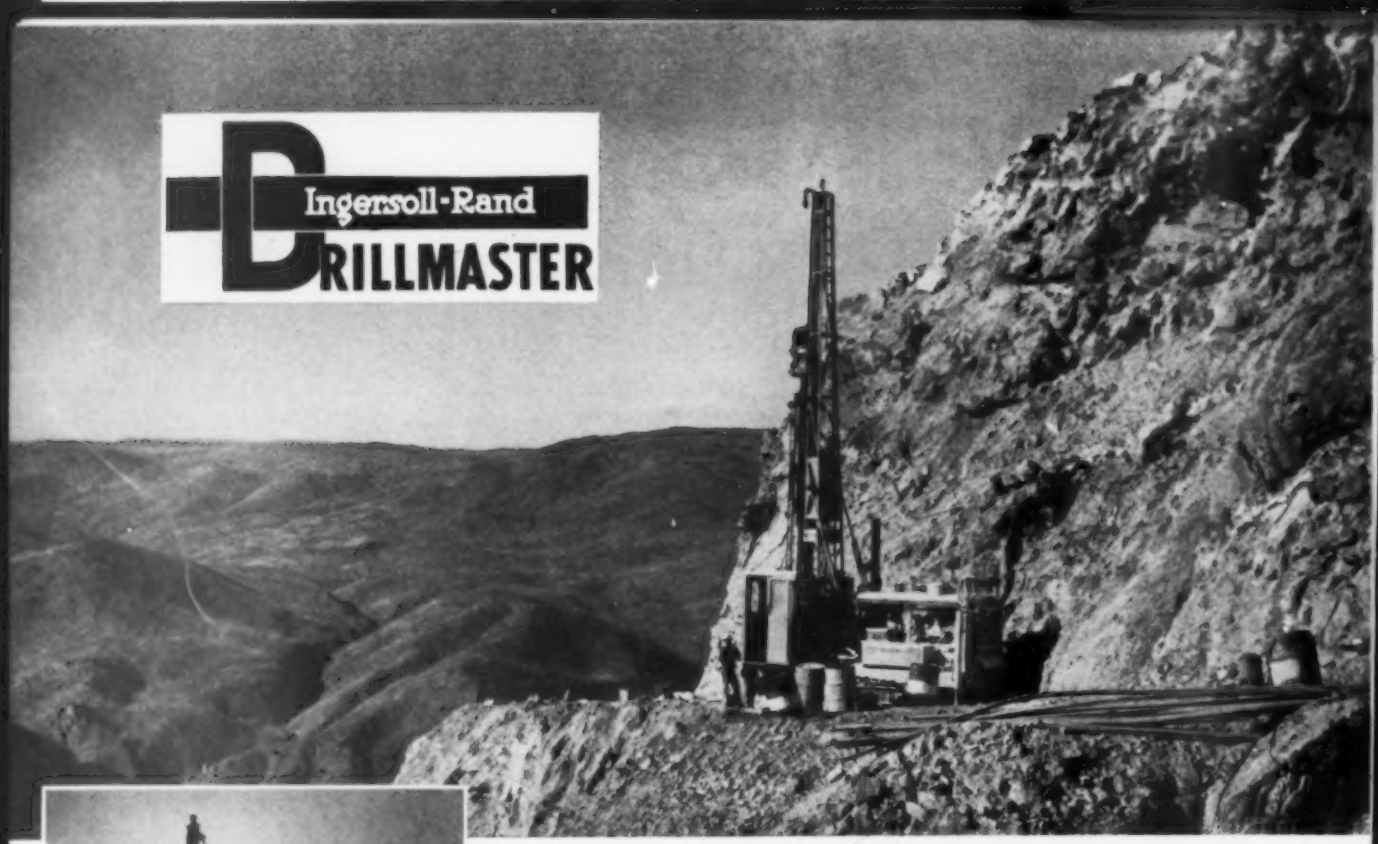
Raymond Laboratory Separator . . . a small 10-inch diameter unit for making test runs for any type of fine particle size materials.

COMBUSTION ENGINEERING, INC.
Raymond Division

1321 North Branch St.
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada



"TRACM" MOUNTING

"TRUCM" MOUNTING

OUTSTANDING PERFORMANCE

On job after job, Ingersoll-Rand Drillmasters are sinking 200 ft or more of 6-inch blast holes per day. Not just occasionally, but day after day on a routine production basis. That's why so many users have hailed the Drillmaster as the most productive blast hole drilling unit ever developed.

Completely self-powered and self-propelled, the Drillmaster meets every drilling requirement. Use it with the I-R down-the-hole drill, or as a rotary drill. In any type of ground, Drillmaster performance is its own best recommendation.

AND VERSATILITY TOO

In addition to the complete crawler-mounted Drillmaster, you can also obtain the basic Drillmaster and compressor unit for mounting on your own tractor or truck. The "TRACM" mounting is ideal on rough terrain — takes your Drillmaster anywhere a tractor can go. The "TRUCM" mounting saves time, effort and expense on jobs of short duration. For complete information, send today for Drillmaster Bulletin No. 4179.

A Constant Standard of Quality in everything you need for drilling rock

Ingersoll-Rand

5-696 11 Broadway, New York 4, N. Y.

COMPRESSORS • HYDRA-BOOMS • WAGON-DRILLS • CRAWL-IR • DRIFTERS • JACKHAMERS

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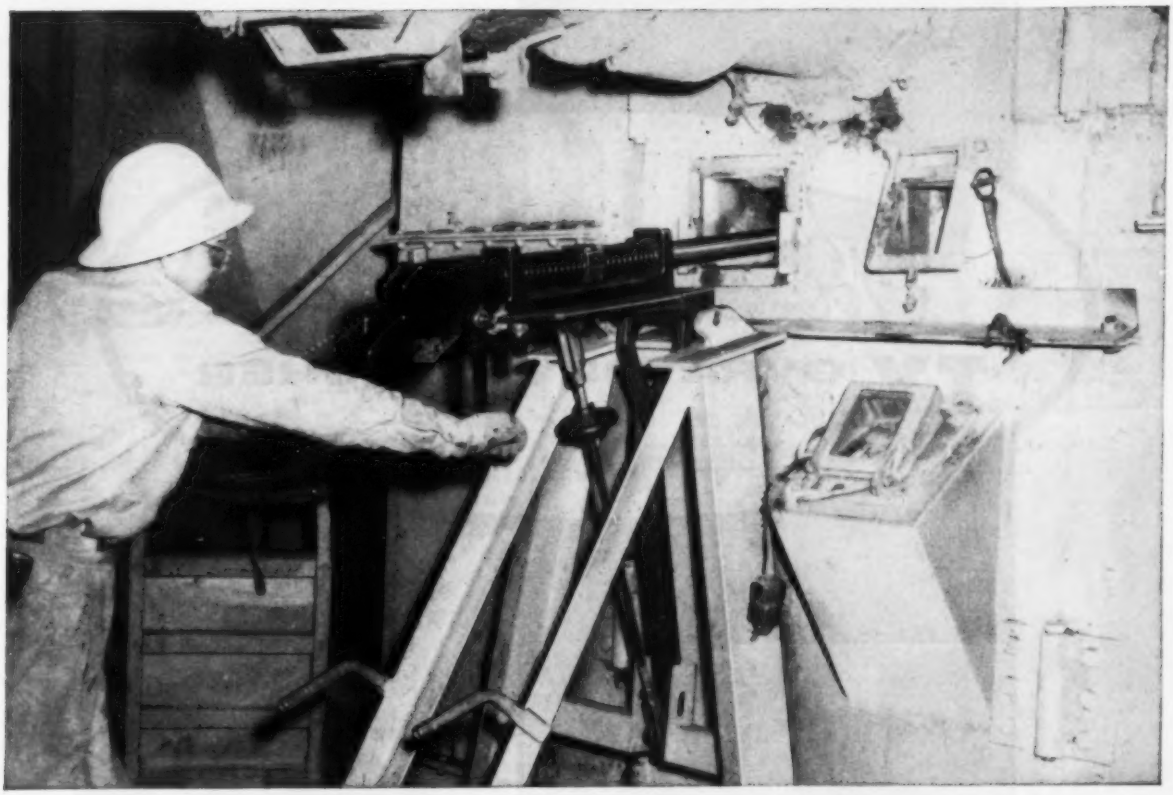
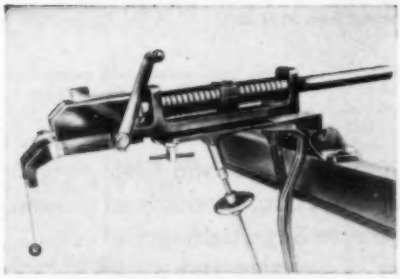


Here's the easy, cost-saving way to remove Clinker Rings—



WITHSTANDS HIGH TEMPERATURES AT KILN HOOD. Special steels and castings enable the Remington Industrial Gun to operate safely at kiln hood temperatures. Gun is easily installed by attaching bolster to hood I-Beam or movable mount as shown.

Remington Industrial Gun

You save valuable man-hours in removing clinker rings with the hard-hitting Remington Industrial Gun. A pull of the gun's lanyard does the work of many sledge hammers... brings rings and other troublesome kiln formations down in minutes!

No need to wait until kiln cools off. In fact, you don't have to turn off flame or stop rotation until you're ready to shoot. Then just load . . . aim at ring juncture and BAM—the 9,000 ft.-lbs. of knockdown power from a Remington Industrial Magnum* shell smash into the ring! It takes only a short time to dislodge it—without damage to kiln or lining—and you're quickly back on full-time schedule.

Here's proof: One Georgia refractory saved 222 man-hours and gained 26 hours' production time per month with this easy-to-use, one-man tool. So don't let clinker rings "bottleneck" your plant, let the Remington Industrial Gun cut downtime to a minimum. Just clip and mail coupon for our illustrated, fact-filled folder.

** For shorter kilns, Remington Standard Industrial Shells fill the bill. 7,500 ft.-lbs. of energy are delivered!*

Remington

DUPONT

Remington also manufactures the Model 455 and "Mighty-Mite" Stud Drivers for instant fastening into concrete or steel.

Industrial Sales Division PQ-1
Remington Arms Company, Inc.
Bridgeport 2, Conn.

Please send me your free booklet which shows how the Remington Industrial Gun speeds removal of clinker rings.

Name_____ **Position**_____

Firm_____

Address_____

City_____ **State**_____

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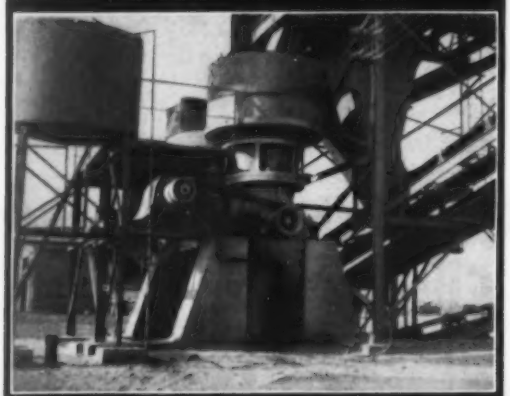
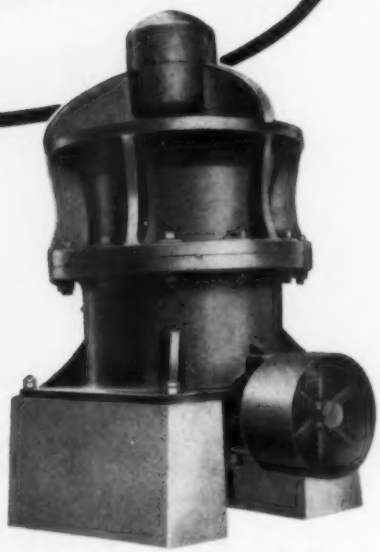
Traylor-MADE TY GYRATORY CRUSHER



3'-0" TY Crusher in rock and gravel producing plant.



These reduction crushers are built in six sizes from 1'-3" to 5'-6" and with feed openings from 3" to 22".

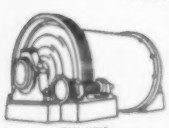
Traylor TY Reduction Crushers require minimum floor space and little head room and contain features that combine high production, economy of operation and lower maintenance costs. Operators secure large tonnages of small product, of uniform size, with low percentages of oversize and waste fines. Write for bulletin No. 8112 today!

TRAYLOR ENGINEERING & MFG. CO., 1005 MILL ST., ALLENTOWN, PA.

Sales Offices: New York — Chicago — San Francisco

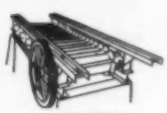
Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P. Q.

Traylor



BALL MILLS

ROTARY KILNS



APRON FEEDERS

PRIMARY GYRATORY CRUSHERS

JAW CRUSHERS

SECONDARY GYRATORY CRUSHERS

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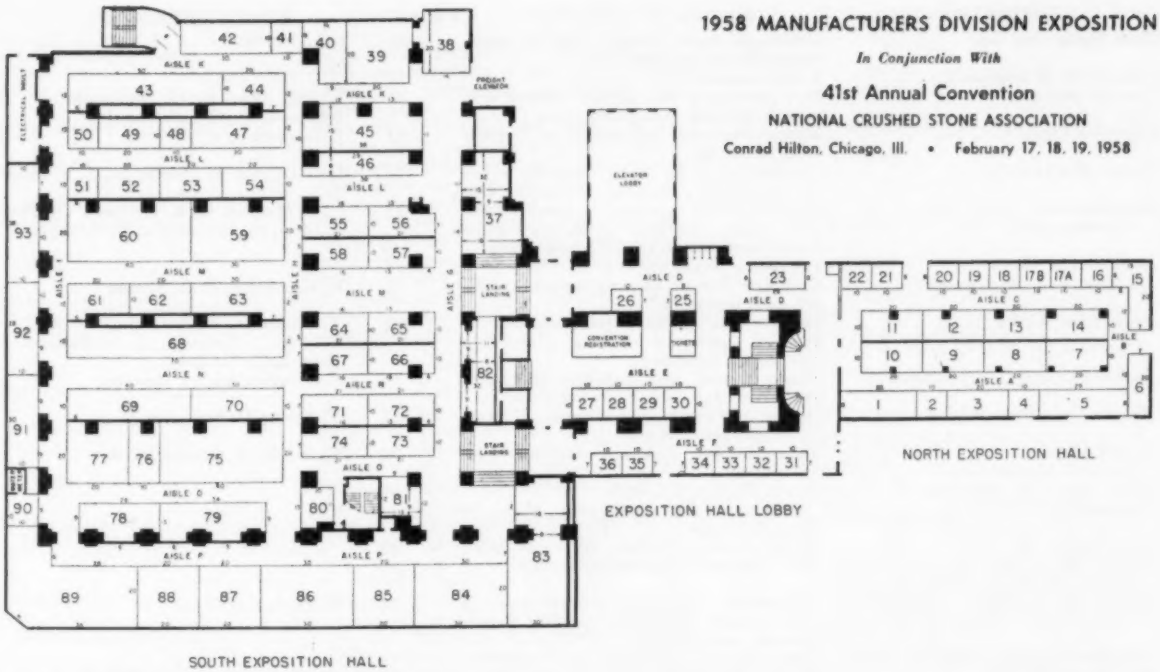

1958 MANUFACTURERS DIVISION EXPOSITION
In Conjunction With
41st Annual Convention
NATIONAL CRUSHED STONE ASSOCIATION
Conrad Hilton, Chicago, Ill. • February 17, 18, 19, 1958
SOUTH EXPOSITION HALL
EXPOSITION HALL LOBBY
NORTH EXPOSITION HALL

N.C.S.A. Manufacturers Division Exhibits in Conrad Hilton Hotel

EXHIBITOR	PRODUCTS SHOWN	BOOTH	EXHIBIT PERSONNEL
Allis-Chalmers Mfg. Co.	Industries group: screening, crushing equipment, pumps, motors, drives. Tractor group: tractor shovel, rock wagon, engine-generator set	75	G. P. Molzahn, R. M. Stone, J. M. Haile, A. E. Thode, R. G. Goodden, D. E. Cavanaugh, J. C. Collier, E. H. Baxa, J. E. Dunn, F. E. Briber Jr., A. Goldberg, R. N. Brown
American Cyanamid Co.	Complete line of dynamites to be featured, and electric blasting caps, new type explosive; case histories in mining, quarrying, construction	3	G. C. Holton, J. R. Burkett, C. B. Martin, G. F. Moses, A. J. Perantoni, E. C. Farrar, W. H. Trotter
American Manganese Steel Div. American Brake Shoe Co.	Shovel, tractor components including 2½-cu. yd. dipper, shovel shoe for crawler, tractor shoe, crusher jaw plates, hammers, dipper teeth, welding machine electrodes, sample hard-faced wear parts	38	N. M. McGuire, D. G. Sherwood, W. W. Gray, H. B. Reinhardt, T. A. Perry, E. L. Wegerson, W. M. Barron, H. D. Sweeney, H. C. Satterlee
American Steel & Wire Div. U. S. Steel Corp.	Photo display, samples of wire rope and applications in quarry and pit operations	64	H. Price, et al.
Aquadyne Corp.	Automatic dust control system, wetting agent; components including pumps, valves, control signal sources	16	
Atlas Powder Co.	Latest blasting agents, visual demonstration on detonating devices; film	1	J. Dannenberg, et al.
Baldwin-Lima-Hamilton Corp.	Photo display illustrating equipment applications in crushed stone industry	82	Stan Kreher, et al.
Barber-Greene Co.	Photo display panels of equipment for various production phases	59	
Brunner & Lay	Drilling tools, accessories; extension steel for crawler drills	7	J. A. Klemeyer, J. Neamand, W. Burnside, W. E. Schaefer, E. A. Bowman, F. Brunner
Bucyrus-Erie Co.	Operating model 6-cu. yd. shovel	85	L. C. Black, et al.
Cape Ann Anchor & Forge Co.	New model forged steel drop ball, standard model; display showing forging of drop balls	28	A. H. Nutton
Caterpillar Tractor Co.	New mechanical and electrical combination engine drive unit for crushers, other industrial power supply and material handling equipment; new side dump bucket for tractor excavators	60	A. Koetter, R. Lord, B. Bessert, J. P. Morgan
Chain Belt Co.	Chain and power transmission equipment including conveyor and roller chain products; bulk material handling units: bucket elevators, feeders, conveyors and conveyor components, bearings	23	J. W. Snavely, S. Kurtz, A. Krueger, W. Kennedy, T. Shafer

EXHIBITOR	PRODUCTS SHOWN	BOOTH	EXHIBIT PERSONNEL
Clark Equipment Co.	Late model tractor shovels, Film on application and use of these units	89	J. L. Dorfler
Contractors & Engineers	Trade magazine	6	
Cross Engineering Co.	New perforated steel screen sections with turned, integral edge preparation	48	G. H. Day, S. H. Fulkerson, R. G. Johnston, D. C. Coleman Jr.
Cummins Diesel Co., Inc.	Torque converter unit and diesel engines —75 to 600 hp.	83	J. D. Gatten, et al.
Deister Machine Co.	Double-deck 4- by 10-ft. vibrating screen (in operation); literature, technical data	72	I. F. Deister, E. Deister Jr., I. F. Deister Jr.
Diamond Iron Works Div. Goodman Mfg. Co.	Erected section conveyor suspended from wire rope; complete with suspension frame work and linked idler assemblies	11	C. E. Hanson, D. R. Freeberg, O. Olson, J. Hart, G. McCorison, J. Harrigan
Drill Carrier Corp.	Literature, photo display	88	
Du Pont, E. I., de Nemours	Complete line of blasting agents; technical data, literature	12	P. K. Alvord, E. L. Thayer
Eagle Iron Works	Breaker ball display; full literature on line of aggregate washing, classifying, dewatering equipment	71	T. Aulmann, R. Aulmann, C. Laird, H. White, J. Twyman, J. McFarland, S. Ford, C. B. Cochran
Easton Car and Construction Co.	Photo display and bulletins illustrating equipment for mine and quarry service	19	G. Fraunfelder, H. Dempsey
Electric Steel Foundry Co.	Bucket and shovel dipper teeth, adapters, cutting edges, and bits	13	T. Kirby, E. Berger, et al.
Euclid Division General Motors Corp.	Photo display, technical data on heavy equipment	79	R. Keidel, R. Rogers, et al.
Frog, Switch & Mfg. Co.	Photo display, literature	41	
Gardner-Denver Co.	Compressors, drill components, photo display, literature	45	
General Electric Co.	Photo display, literature, technical data	90	
George Haiss Mfg. Co. Div. of Pettibone Mulliken	See Universal Engineering Corp.	86	
Harnischfeger Corp.	Adjustable electrical energy controls, hoist systems for electric shovels; demonstration unit, movies	56	F. Hirner, et al.
HarriSteel Products Co.	Photo display, literature	50	
Hendrick Mfg. Co.	Samples of perforated screens in various types and sizes of perforations; open floor grating, samples of wedge slot and wire	65	K. H. Colville Jr., E. D. Schreckengost, W. B. Stoddard Jr., R. F. Vandenberg, H. Buckley, W. F. Kendrick, L. C. Cooley
Hercules Powder Co.	Photo display, literature, technical data	22	
Hewitt-Robins, Inc.	Vibrating feeders, screens, sectional conveyor, conveyor components, speed reducer, electronic level indicator	68	W. B. Hicks, et al.
Howe Scale Co.	Graphic panel illustrating latest scale equipment and weighing techniques	29	J. S. Blackwell, D. S. Erickson, T. P. Cosgrove
Hoyt Wire Cloth Co.	Various size samples of different constructions, weaves, edge preparations of wire screens; includes double crimp, smooth top, intermediate crimp construction	17A	F. G. Hoyt, R. K. Warner
Ingersoll-Rand Co.	Self-propelled crawler-type wagon drill mounting bit grinder, complete line down-the-hole drills and bits, jackhammers, portable and stationary compressors	43	T. Slager, et al.
International Harvester Co.	Photo display, operating model tractor	92	H. J. Reichus, R. G. Greer, W. M. Holland, L. J. Lange, C. E. Jones, W. G. Hall, R. L. Elliott
Iowa Manufacturing Co.	Individual units processing equipment, including vibrating screen, impact breaker, twin jaw crusher; bulletins on new equipment including twin-shaft pugmill, portable crushing, and secondary plants	84	A. C. Gossard, et al.
Jaeger Machine Co.	Portable rotary compressors, self-priming centrifugal pumps; full size working cutaway of compressor; submersible sump pump	39	A. C. Thomas, D. D. Murray, R. J. Tuuri
Jeffrey Mfg. Co.	Swing hammer mill, electric vibrating feeders, various chains and power transmission items	78	J. C. P. Taylor, H. J. Flint, L. E. Brill
Johnson-March Corp.	Chemical jet type dust control system	4	R. B. Epperson, W. B. Aarons, R. B. Jones
Joy Manufacturing Co.	New type crawler-mounted drill; complete line of rock drill bits; photo display on compressors, blasthole drills, conveyor components	52	W. H. Preston, T. R. Lake, W. S. Fitz, J. S. Morrow, F. B. Waddock, D. Smith, J. Dolley, A. Anderson, S. J. Kail Jr.
Kennedy-Van Saun Mfg. & Engineering Corp.	Late models of impact breakers, conveyor components	27	E. C. Herschelman, H. Behr, R. W. Reedy
Kensington Steel Div. Poor & Co.	Manganese steel castings of crusher and shovel repair components, tractor rails, grousers, sprocket rims	58	E. A. Lerner, et al.
Koehring Co.	Off-road instant dump haulage unit	87	E. J. Goes, E. B. Hill, A. Cossens, R. K. Patterson, E. Aho, C. M. Andresen, K. R. Chandler, P. H. Kearns
Link-Belt Co.	Latest series conveyor idlers, silent and roller chain drives, speed reducers, mechanical power transmission components; photo display vibrating screen and sectional conveyor applications	54	

EXHIBITOR	PRODUCTS SHOWN	BOOTH	EXHIBIT PERSONNEL
Link-Belt Speeder Corp.	Operating model of power hydraulic control system; photo display of complete line of excavating equipment and applications	53	
Ludlow-Saylor Wire Cloth Co.	Samples of square and long opening woven wire screens; abrasion, fatigue-resistant, stainless steel, and other special alloy units also featured	80	J. F. Steffens, H. W. Betzold, M. F. Erbe
Mack Trucks, Inc.	Photo display, literature	77	
Manganese Steel Forge Co.	Woven screen, perforated plate, pins and bushings, skirt boards, wear plates, other weldments; two new catalogs on screens and fabricated items	74	H. C. Doepken, et al.
Marion Power Shovel Co. Div. of Universal-Marion	Photo display of various shovel models in world-wide operations; ¾- to 10-cu. yd. units illustrated	8	M. T. Smith, A. F. Busick Jr., M. V. Cornell, L. C. Mosley, D. B. Reed Jr., W. Pierson, E. Marinik, E. E. McCartney, Q. A. Shay, W. H. McAllister, P. Fenwick
Marsh, E. F., Engineering Co.	Conveyor section, components, photo display, literature	15	
Mayhew Supply Co., Inc.	Literature, photo display	17B	
McLanahan & Stone Corp.	Model screw and log washers; photo display of complete line of pit, quarry, and mine equipment — particularly washers, crushers, feeders	73	J. C. McLanahan, R. Fye, R. Brown, R. Rumbaugh
Murphy Diesel Co.	Late model of mechanical-electric diesel power unit, cut-aways of engine design, and construction features; photo display of various installations	69	P. Schnetzky, et al.
Nordberg Mfg. Co.	Operating models (¼ scale) of crushers, screens, rod and bar grizzlies; continuous film on operation and application of crushers in portable and stationary service	93	D. A. Cheyette, J. B. Bond, H. N. Propp, J. W. Crandall, J. D. Grace, G. D. Becker, H. M. Zoerb, R. E. Schultz, L. F. Thompson, et al.
Northern Blower Co.	Literature and information on automatic and intermittent bag type dust arresters, cyclone units, hydraulic washers, fans.	20	L. A. Eiben, H. E. Hoon Jr.
Northwest Engineering Co.	Photo display, technical data, literature	47	R. W. Cornelison, E. R. Windahl, G. Williams, B. H. McIntosh, et al.
Olin Mathieson Chemical Corp.	Photo display, literature, technical data	5	
Pettibone-Mulliken Corp.	See Universal Engineering Corp.	86	
Pioneer Engineering Div. of Poor & Co.	Unit from new line of portable duplex crushing and screening plants; operating model (¼ scale) of complete crushing, screening, and sizing plant	37	C. R. Rolf, A. J. Belanger, C. G. Sears, F. W. Hartlage, W. A. Rundquist, D. Davis
Pit & Quarry Publications	Trade magazine	2	
Productive Equipment Corp.	Double-deck base-mounted 4- by 12-ft. screen with deep side sheets; technical data, literature	49	G. W. Dwyer, L. H. Lehman, L. M. Haluch, L. C. Crismore
Quaker Rubber Div. H. K. Porter Co.	Conveyor, elevator, transmission belting samples; hose samples (air, water, oil, etc.), technical data	30	J. R. Alexander, A. M. Lowrey, R. R. McCracken, F. J. Tucker
Rock Products	Trade magazine	21	
Screen Equipment Co.	Late model of 4-bearing 3- by 8-ft. double-deck screen; new design 2-bearing 3- by 10-ft. triple-deck screen; literature	42	C. S. Fielding, N. J. Gleiser
Simplicity Engineering Co.	Vibrating feeder grizzly and double-deck screens	91	R. C. Johnson, D. Aleshire, F. Barber, A. Darcus, A. DeSoto, M. H. Dodge, R. Von Fleckenstein, B. Schmidt
SKF Industries, Inc.	Improved spherical roller bearings with new central lubrication feature; new triple-seal pillow block, complete line of bearings including tapered, roller, and pillow blocks	66	
Smith Engineering Works	Working models of late design equipment including crusher, scrubber, feeder, and cyclone for recovery of fine material from waste wash water	55	D. Barnes, H. Schaper, et al.
Soiltest, Inc.	Late design concrete briquette tester, portable concrete tester (200,000-lb. capacity), varied test apparatus for soils, asphalt, portland cement concrete	18	T. W. Van Zelst, E. E. Brush, J. R. Haverkos, W. R. Fuerst, G. E. Stanley
Stedman Foundry & Machine Co.	Working models of single cage and 2-row cage disintegrators; bulletins on complete line of crushing, screening, and mixing equipment	62	L. A. Rhodes, P. Perrine, et al.
Stephens-Adamson Mfg. Co.	Belt conveyor components, feeder pans, bin level indicator, conveyor mounted piler for stock-piling from conveyor belts	61	W. E. Cousland, T. A. Ruddy
Taylor-Wharton Div. of Harsco	Photo display, literature, technical data	67	
Thew Shovel Co.	New 1¾-cu. yd. rubber-tired front-end loader; photo display of shovel and crane units; working demonstrator unit of 2-lever air power controls	70	M. B. Garber, G. E. Gunther, J. L. Beltz, W. H. Madden, F. J. Broad, R. T. Maynard, O. E. Reynolds, G. W. Glynn, J. D. Zook, R. W. Bairstow, F. A. Williamson, A. F. Claus, C. S. Weber

EXHIBITOR	PRODUCTS SHOWN	BOOTH	EXHIBIT PERSONNEL
Thor Power Tool Co.	New model self-propelled track-type wagon drill, standard wagon drill, power trowel, gasoline engine driven generator set	40	B. H. Johns, F. J. Schiel, M. F. Collins, G. Laux, K. W. Nelson, D. Taylor
Torrington Co.	Extensive line of bearings, featuring a self-aligning spherical roller type; also cylindrical and tapered rollers, ball, needle, and roller thrust bearings	57	R. U. Sautter, J. C. Heyvaert, J. A. Sarka, W. M. Walker, J. N. Wholean, R. E. Pardon, C. G. Whytlaw Jr., G. E. Marvel
Tractomotive Corp.	Photo display, literature	76	
Traylor Engineering & Mfg. Co.	Photo display of jaw and gyratory crushers, kilns, feeders, etc.; literature, technical data	10	C. H. Roberts, S. Ekerovich, O. E. Thaleg
W. S. Tyler Co.	Latest design 4- by 10-ft. two-surface vibrating screen, testing sieve shaker, screen scale testing sieves, large selection woven wire screens	63	W. W. King, J. H. Jackson, J. W. Sullivan, V. A. Kaufmann, H. F. Lawrence, C. E. Jenks
Universal Engineering Corp.	Featured working model of feeder-scalper; models of impact breaker, primary crushing plant; literature, photo display	86	H. J. Knudten, D. R. Conway, R. D. Conway, A. K. Holets, V. E. Hansen, E. Y. Jones, W. J. Burian, M. W. Preston, M. Miller
Vibration Measurement Engineers	Late model, low-weight seismological instrument for blasting and construction vibration measurements; unit will be demonstrated; photo display, technical data	51	J. E. Jenkins, R. Jenkins, G. L. Murphy, W. D. McCarthy
Werco Steel Company	New model 3- and 4½-ft. impact crushers; display of crusher jaws and rolls, pulverizer parts, perforated steel plate	44	T. E. Bridgewater, C. A. Adams, S. E. Bergman, D. B. Massey, K. J. Brennan, J. Konecci, H. Johnson, E. H. Jerabek, A. J. Arvia, G. A. Bland, K. Strosinski
White Motor Co.	Photo display of large haulers in operation; also products of Reo division; literature, technical data	46	J. N. Bauman, P. E. Tobin, R. L. Weider, H. R. Stickel, E. H. Gustafson, L. B. Gilbert, J. E. Tooker, J. L. Adams, K. A. Roesch, H. L. White
Wickwire Spencer Steel Div. Colorado Fuel & Iron Corp.	Wire rope, special alloy screen-cloth; photo display, technical data on applications	81	S. Rairden, E. L. Klinger, R. W. Ramer, L. J. Renner
Williams Patent Crusher & Pulverizer Co.	Photo display featuring operating cross section of reversible impactor; operating model of mechanical air separator; full size crusher and pulverizer unit	14	R. F. Schneider, E. M. Carson, W. W. West, J. Law, R. Williams, A. L. Braun

N.C.S.A. Program

(*From page* 184)

tive vice-president, Houdaille Construction Materials, Inc. Division of Houdaille Industries, Inc., Morristown, N. J.

9:00—"Quarry Efficiency Standard Record Keeping"—T. C. Cooke, president Lynn Sand & Stone Co., Swampscott, Mass.

9:15—"Studies on the Efficiency of Quarry Operations"—M. J. Kilpatrick, engineer, U. S. Bureau of Public Roads, Washington, D. C.

9:45—"Knowing's Not Enough"—Sound-color motion picture, courtesy of United States Steel Corporation, Pittsburgh, Pa.

10:15—Coffee break

10:30—"Recent Trends in Plant Design"—R. T. Lassiter, New York District manager, Western-Knapp Engineering Company, Company, New York, N. Y.

11:15—"Timely Tips on Operating Problems"

12:00—Adjournment

Company Policy Makers' Round Table

10:00-12:00—Discussion Leader — John F. Lane, Gall, Lane and Howe, Washington, D. C.; general counsel, N.C.S.A.

This Round Table will be a give-and-take session for company policy makers and advisors concerned with federal regulations affecting the crushed stone industry.

12:30—Manufacturers Division luncheon and annual business meeting (for members of the Manufacturers Division only)

2:30—Committee Reports

3:00—"This Problem of Skid Resistance"—A. T. Goldbeck, engineering consultant, National Crushed Stone Association, Washington, D. C.

3:30—"Telephone Techniques" Clinic — Charles Bury, communication consultant, Dallas, Tex.

4:30—Adjournment

WEDNESDAY, FEBRUARY 19

9:00-12:00—Inspection of Manufacturers Division Exposition

12:30—General Luncheon

"Soviet Union and Eastern Europe"—Jack Raymond, New York Times correspondent, Washington, D. C.

Afternoon Session

2:30—Report of engineering director—J. E. Gray

3:00—"Aggregates for Federal-Aid Roads"—Harold Allen, chief of division of tests, U. S. Bureau of Public Roads, Washington, D. C.

MARCH OF DIMES

Support the March of Dimes, to aid the prevention program and speed rehabilitation work.

3:30—"Blasting Vibrations—Cause and Effect"—Sound-color motion picture, courtesy of Hercules Power Company, Wilmington, Del.

4:00—"An Effective Public Relations Program for an Aggregate Producer"—Earl P. Nolwadel, sales manager, Ohio Gravel Co., Cincinnati.

4:30—"Legislative Outlook"—John F. Lane, Gall, Lane and Howe, Washington, D. C.; general counsel, National Crushed Stone Association

5:00—Adjournment

Evening

6:00—Cocktails

7:00—Dinner dance—entertainment

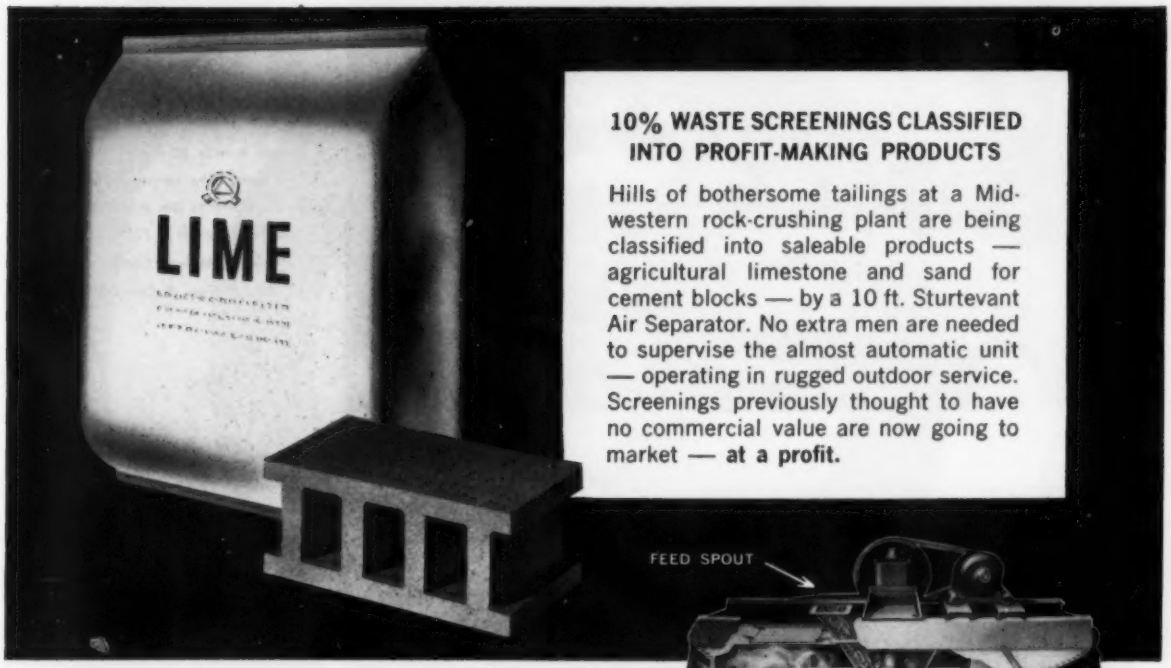
Permanente, Kaiser Gypsum Report Top October Sales

Accelerated sales efforts and increased production capacity resulted in record sales for the Permanente Cement Company and its subsidiaries in October, according to Wallace A. Marsh, vice-president and general manager.

For the first time in the company's history more than 1,000,000 bbl. of cement were sold in one month. The company's cement plants at Permanente and Lucerne Valley, Calif., have a combined annual production capacity of 11,000,000 bbl.

Kaiser Gypsum Company, a wholly owned subsidiary, also showed strong sales gains in October. The company's gypsum division recorded a substantial sales increase compared to the same month of 1956.

Tailings Go to Market - Separated by Sturtevant



10% WASTE SCREENINGS CLASSIFIED INTO PROFIT-MAKING PRODUCTS

Hills of bothersome tailings at a Mid-western rock-crushing plant are being classified into saleable products — agricultural limestone and sand for cement blocks — by a 10 ft. Sturtevant Air Separator. No extra men are needed to supervise the almost automatic unit — operating in rugged outdoor service. Screenings previously thought to have no commercial value are now going to market — **at a profit.**

THE SEPARATOR THAT UPPED 40 TO 400 MESH OUTPUT AS MUCH AS 300%

Sturtevant Air Separators range from 3 to 18 ft. in diameter: deliver fines from 40 to 400 mesh at rates as high as 65 tons per hour . . . in the cement industry, have a tested record of increasing mill capacities from 25 to 300% while lowering power consumption as much as 50% — when used in closed circuit with grinding mills.

Designed to cut costs and build profits, Sturtevant Air Separators give a lifetime of high-efficiency, low down-time service. Rugged construction plus easy accessibility for quick maintenance (typified by the "Open-Door" design in other Sturtevant equipment) assure more output per machine year.

Write today describing your problem. Please include information on material, process and desired capacity.

Address: Sturtevant Mill Company,
104 Clayton St., Boston 22, Mass.

What Can a Sturtevant Air Separator Do in Your Pulverizer System?

Controlled centrifugal whirl by balancing forces separates rapidly, efficiently, cement, lime, clay, talc, ceramics, refractories, phosphates, coal and many other materials. Also used for selection of pigments, limestone, fillers, plastics, oyster shells and abrasives. Write for Sturtevant Bulletin No. 087.

STURTEVANT
Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

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HOW TO GET LONGER PIPE LIFE

Durable Armco Pipe saves money in hydraulic mining

PHOSPHATE MINING

Nearly a mile of Armco Special Analysis Steel Pipe carries abrasive phosphate slurry to the processing plant at the Polk County, Florida, plant of Davison Chemical Company, Division of W. R. Grace & Company.

DREDGING

Dredges with 20-inch-diameter Armco Pipe discharge lines handle 1,000 tons of material an hour at American Aggregate Corporation's Green Oak, Michigan, plant.

In dredging, phosphate mining, and similar hydraulic mining operations, pipe replacement can take a big share of the maintenance budget. Armco Special Analysis Steel Pipe can help you reduce this expense.

Armco Pipe provides excellent abrasion resistance and high structural strength. This means long service life . . . lower cost per cubic yard of material handled.

You can easily meet your requirements from the wide range of diameters (6 to 36 inches) and wall thicknesses ($\frac{9}{64}$- to $\frac{1}{2}$-inch) available in Armco Pipe. Ends can be supplied machine-reduced or expanded. Interiors are smooth—free from laps and weld protrusions—for high flow capacity.

Write us for data applied to your specific needs. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 4677 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

ARMCO SPECIAL ANALYSIS STEEL PIPE

ARMCO®

NOW—*BULL'S-EYE KILN CONTROL*

at maximum capacity

Your recorder charts will resemble bull's-eye targets when your kiln is equipped with Bailey Automatic Kiln Control. A Bailey controlled kiln literally thinks for itself . . . Reacts quickly and correctly to any changes in operating conditions. Steady-state operation at maximum kiln capacity is achieved for days at a time with little or no supervision.

A Bailey Engineer will be glad to help you plan for *bull's-eye* kiln control. Write for a ROTARY KILN CONTROL FOLDER, complete with case histories and charts. C-9

Instruments and controls for power and process

BAILEY METER COMPANY

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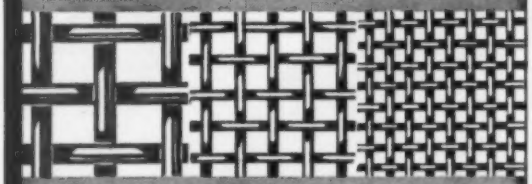
In Canada—Bailey Meter Company Limited, Montreal

BAILEY METERS

STRONG AS ARMOR
NAT-ALOY
Woven Wire Screens



Reliable Nat-Aloy woven wire cloth is specified throughout industry for maximum screening accuracy and economy.

Available in flat surface, lock crimp, double crimp, rectangular and long slot openings. All sizes, meshes and gauges—prompt shipment.

WE OFFER NOW... SUPER NAT-ALOY
OIL TEMPERED WOVEN WIRE CLOTH
★ GREATER RESISTANCE TO ABRASION
★ MORE TONNAGE AT LOWER COST
★ FEWER COSTLY CHANGE OVERS

Write for information. Also stainless steel wire screens.

NATIONAL WIRE CLOTH COMPANY
252 W. Fairfield Ave., St. Paul 1, Minnesota

Enter 264-A on card, page 167

LOW COST POWER
For Fast "Secondary Breakage"

FREDERICK
CAST SEMI-STEEL
DROP BALLS

Tough, rugged Frederick Drop Balls give you crushing power where you want it, when you want it . . . cut down expensive drilling or blasting . . . give long, economical service with little or no maintenance. Exclusive "Pear shaped" design withstands greater impact—drops straighter. "E-Z Swing" recessed steel eye gives cable protection plus free swinging action. Use Frederick Cable Weights (135 & 250 lbs.) and Frederick Swivels on all size balls for true, safe cable performance. Nickel alloy standard on all 4000 lbs. or over—or special alloys furnished on request. Balls can be furnished with replaceable pins. Special release hooks for free dropping also available.

Write us today for prices and illustrated literature. Order Balls direct or see your nearest Equipment Dealer.

	Wide Range of Sizes and Weights:						
Pear shape (lbs.)	1500	2000	3300	4000	5200	6500	8000
Ball shape (lbs.)	500	1000	2000	5200			
Spherical shape (lbs.) (for magnet use)	470	950	1650	2400	3000	3700	5400

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FREDERICK Established 1890 MARYLAND
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CENTRIFUGAL PUMPS • MUNICIPAL AND GRAY IRON CASTINGS

Enter 264-B on card, page 167

It's Here!

BRAND NEW
LIGHTWEIGHT AGGREGATE PLANT MAP

Our newest combination map and listing is a *must* to anyone interested in the lightweight aggregate field. All lightweight aggregate plants known to be in existence are listed alphabetically, by state. In addition, the plant's address and the brand name of the lightweight aggregate it produces is given.

The map itself assists in graphically pinpointing the actual geographical location of all of the lightweight aggregate producing plants.

This combination map and listing is 25½ inches wide and 22 inches high. The sturdy paper stock it's printed on makes it ideal for framing or pasting on any flat surface.

The following are the quantity prices charged for this map.

QUANTITIES	PRICE
1 — 10 maps	35¢ each
11 — 20 "	30¢ "
over 20 "	25¢ "

We will be happy to fill your order for any number of maps you may desire.

PIT & QUARRY PUBLICATIONS, INC.
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DEPENDABLE DARTS

TONNAGE ENGINEERED TO MEET YOUR REQUIREMENTS

"10 SUG UNDERGROUND" — DART'S 10 Ton Underground Shuttle Truck has 6 cu. yd. rock body. 125 H.P. Diesel Torque Converter-Transmission with 3-speeds "forward and reverse" exhaust scrubber. Dual controls.

For over 53 years, the DART TRUCK COMPANY has specialized in custom trucks. Today's standard production model off-highway units are in a wide tonnage range with a variety of optionals to meet performance needs. Advanced engineering and features such as DART'S box girder frame, planetary axles, oversize bearings and many others assure dependability and lowered cost-per-ton haulage.

"10 SL" — 10 Ton DART "Jr. Workhorse", 165 H.P. diesel, double reduction rear axle. Maximum power and speed to meet rugged conditions.

There is a DART man near you who can help you solve your haulage problems.

"15 SL"

15 ton DART with 175 or 220 H.P. diesel. Single and three-stage converters optional. 11-cu. yd. rock body is standard equipment.

"35SL"

35 ton DART powered by 400 H.P. diesel, 3-stage converter and 3-speed transmission (optional single-stage converter and 4-speed semi-automatic transmission.) 110,000 lb. planetary drive rear axle.

"DART 25SL"

25 ton capacity. 300 to 335 H.P. 3-stage converter and 4-speed transmission (optional single-stage converter and 4-speed semi-automatic transmission.) 100,000 lb. planetary rear axle.

"DART 50 T"

50 ton capacity, powered by 400 H.P. diesel. Rock body is 31 cu yds. (struck) and has 2 four-stage telescopic hoists. Hauling speeds to 25 MPH, return speeds to 30 MPH.

***POWER* for the Climb — *SPEED* for the Haul Road**

Write for complete specifications.

DART TRUCKS — TONNAGE ENGINEERED

Kansas City 8, Missouri

SUBSIDIARY OF THE CARLISLE CORPORATION

D-138

"Not merely to sell; but to serve . . . not only to make good steel products; but to make them still better . . . not only to fulfill today's requirements; but to anticipate tomorrow's—these are the principles that constantly guide CF&I."

G. F. Franz
President

We've taken our own advice

When any business is "soft", management often uses this period to clean house. All operating methods are examined carefully with an eye toward increasing efficiency by revising or eliminating those practices that hamper productivity—practices that could not be corrected during peak periods.

In the past, there have been times when the demand for CF&I Grinding Balls has exceeded our capacity, and you have had to wait for deliveries. More recently, demand has been off somewhat, and we have utilized this period to improve our own production efficiency, and new equipment has been added to increase our volume. Now we are in a position, when the demand again picks up, to offer you greater production and quicker deliveries from our enlarged stocks of grinding balls. Thus, we have "anticipated tomorrow's requirements"—we have taken our own advice.

We feel sure that most grinding mill operators follow these procedures—that they *do* make a drive toward increased efficiency during slack periods, so that they will be all the more prepared for periods of intensive output. To help you do this, CF&I has instituted this two-pronged service program:

1. **Engineering Service . . .** CF&I's Mining Products Engineers are ready to analyze your grinding mill problems; make recommendations on how you can improve your operations.
2. **Technical Information . . .** CF&I is currently preparing a series of advertisements containing technical information on ways to improve grinding mill operations.

Take advantage of our Engineering Service and look for the ad series in this publication . . . they'll be appearing regularly during 1958 and reprints will be available. The nearest CF&I sales office will be glad to service your needs.

Other CF&I Steel Products for the Cement Industry

CF&I Grinding Rods • CF&I Rock Bolts • Wickwire Rope
CF&I Mine Rails and Accessories • CF&I Industrial Screens
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THE COLORADO FUEL AND IRON CORPORATION

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Salt Lake City • San Antonio • San Francisco • San Leandro • Seattle • Spokane • Wichita

5362-B

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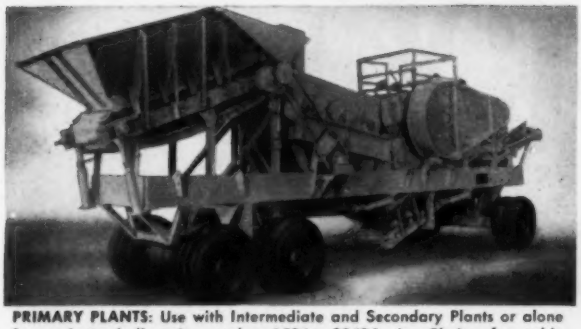
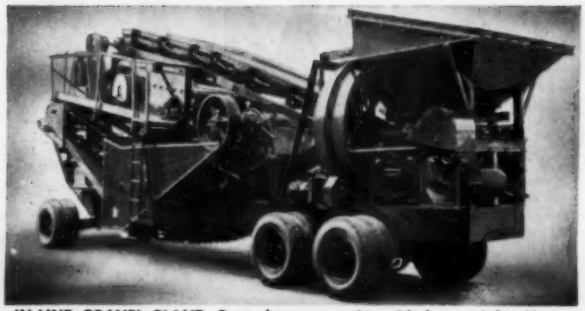


PRIMARY PLANTS: Use with Intermediate and Secondary Plants or alone for producing ballast. Jaw crushers 1524 to 3042 in size. Choice of portable apron or built-in feeder. Some have scalping screen ahead of crusher.



IN-LINE GRAVEL PLANT: Extra large capacity with low weight. Meets most highway load limits. Has 1036 jaw crusher, 30" x 24" rolls, 4' x 12' — 2½ deck vibrating screen . . . yet weighs only 55,900 lbs. on the road!

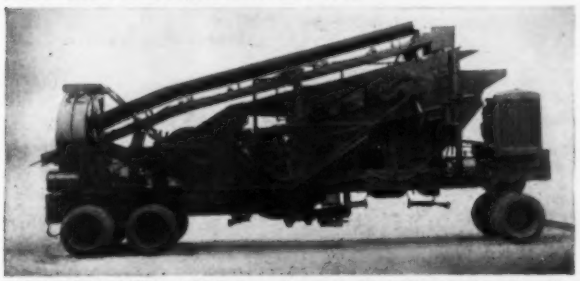
INTERMEDIATE PLANTS: Used with Primary and Secondary Plants to increase flexibility of operation and boost output. Meets highway height, width, and weight limits. Models offer choice of either jaw or roll crusher.

SECONDARY PLANTS: 4 models of Secondary Plants offer choice of 3018, 4022, and 5424 twin roll crushers or 4022 triple roll crusher with 3' x 10', 4' x 10', or 4' x 12' — 3½ deck vibrating screens.

For men who like to underbid their competitors . . . (and make a nice profit, too)

Pioneer Portable Crushing Plants

BOTTOM DECK FEED PLANTS: Exclusive method of routing material through plant gives *twice* the effective screening area of conventional plants, also lets operator equalize load between jaw and roll crusher while plant is operating. These and other features, give extra capacity and unusual control of gradation. Four models.



44 AND 45 SERIES: Full deck sand screen rejects fines and small rock bypasses jaw crusher. These and regular Bottom Deck Feed features give extra big capacity. 4 full screen decks and spouting arrangement can produce 4 sizes of material at same time. Electric or mechanical drives.

PIONEER Distributors and PIONEER's own field engineers are experienced in all phases of aggregates production. They will be glad to study your project, analyze your needs, then help you design an efficient installation that will fit your need.

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EQUIPMENT

Pioneer Engineering, 3200 Como Avenue S.E., Minneapolis 14, Minnesota
Division of Poor & Company, Inc. • Chicago

Please send information on equipment checked below.

☐ GRAVEL & ROCK PLANTS	☐ JAW CRUSHERS	☐ ORE FEEDERS
☐ WASHING PLANTS	☐ ROLL CRUSHERS	☐ MECHANICAL FEEDERS
☐ BITUMINOUS PLANTS	☐ IMPACT BREAKERS	☐ VIBRATING SCREENS
☐ BITUMINOUS PAVERS	☐ APRON FEEDERS	☐ CONVEYORS

Name _____

Company _____

Address _____

City _____ *Zone* ___ *State* _____

Enter 267 on card, page 167

"MARCY kept us in business"

says George Wagner, Superintendent

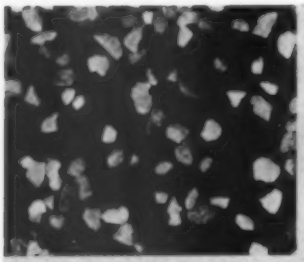
DENVER MORTAR AND MATERIALS COMPANY

now gets $2.00 a yard out of waste gravel

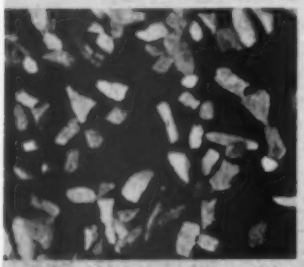
About 6 years ago the company management thought they would have to go out of business. The sand deposit was running over 50% pea gravel for which there was a very limited market ...and they were lucky to get 25c a yard for it. This condition also presented a serious stockpiling problem.

Then they bought a 3′ x 6′ Marcy Rod Mill. Screening at 6 mesh results in approximately equal quantities of plus and minus 6-mesh products. One pass through the rod mill reduces the pea gravel to the desired size for plaster and masonry sand.

George Wagner, Superintendent, says: "The Marcy Mill makes a better product, cleaner and sharper than the natural sand. Now we get $2.00 a yard, wholesale, instead of nothing, out of half of our pit material. The Marcy mill kept us in business."



MARCY CPD MILL PRODUCT



CRUSHER PRODUCT

COMPARISON OF MARCY MILL AND CRUSHER PRODUCTS

Identical rock samples were put through a crusher and a Marcy CPD Mill. The resulting products, screened to −10 +14 mesh, are shown above. Note the elongated shape and sharp, weak edges of the crushed product compared with the uniformly cubical Marcy Mill product.

For complete information on the many advantages of grinding sand with Marcy Rod Mills—

The Mine & Smelter Supply Co.

Denver• Salt Lake City • El Paso • New York

Representatives in Foreign Countries

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SPECIALISTS IN GRINDING FOR FORTY YEARS

How Allis-Chalmers engines bring out the best in any equipment

YOUR EQUIPMENT DOES MORE when powered by Allis-Chalmers high-torque, high-usable-horsepower engines. There is a minimum of pull down due to sudden loads, with quick recovery of engine speed — and real lugging power at slow speeds.

KEEPS WORKING DAY AFTER DAY. There is unusual simplicity in rugged Allis-Chalmers engines. Diesel models, for instance, have 30 to 50 percent fewer wearing parts than competitive engines. Less can go wrong when parts are fewer and stronger.

GETS BACK TO WORK FASTER. Simplicity means easier servicing, too, for Allis-Chalmers engines. They are back to work quickly because you are close to fast parts and service, wherever you are.

See your Allis-Chalmers dealer for full information on engines that will get the most out of *your* equipment — *any* type or size, 9 to 516 hp; *any* fuel, LP or natural gas, gasoline or diesel; for *any* application. Allis-Chalmers, Buda Division, Milwaukee 1, Wisconsin.

BC-10

ALLIS-CHALMERS *Engineering in Action*

Enter 269 on card, page 187

These Special Excavating Jobs Are Best Handled by Sauerman DragScrapers

Deep Digging

900-FT. SPAN— 65 FT. BELOW WATER...

Load is deposited by tensioning the track cable, thus lifting the DragScraper from the pile. Tensioning continues to the desired height for releasing the DragScraper and returning it by gravity to the pit.

Operator controls digging and hauling from cab in head tower.

"the 10-yd. DragScraper is doing a wonderful job and we could not operate without it..."

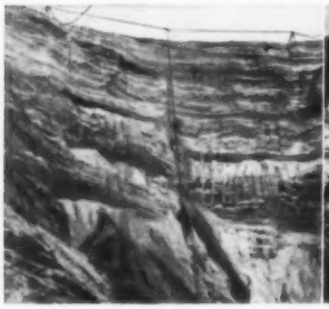
Louis Chinelli, Gen. Supt.
Redman Concrete Corp.

Redman had been trucking material at a cost of $35,000 a year to the location where the DragScraper is now placing it. The 10-yd. Sauerman covers a pond area of 1500′ by 3000′ and is digging 40 ft. deeper than their previous dragline could operate.

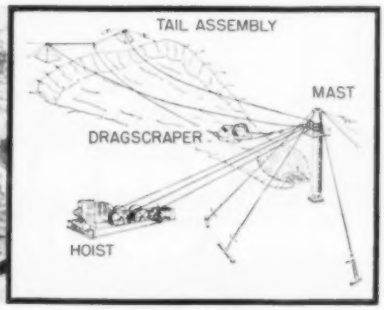
The DragScraper digs and hauls on a 900-ft. span. It operates between a 90-ft. fixed head tower and a 40-ft. mobile tail tower which may be shifted to change the line of operation. The company's 1000-yd.-per-day batch plants and its fleet of mixers and trucks are kept busy by the steady flow of material supplied by the DragScraper.

High Bank Digging

175 FT. HIGH— 600-FT. HAUL...



DragScraper digs from high bank.



Overall view shows height and steepness of bank. Diagram shows details of Sauerman installation.

"I have nothing but praise for our 4-yd. Sauerman Machine. Since the DragScraper began operations in 1952, we have worked it continuously 12 hours a day..."

John D. Robertson, Gen. Supt.
Chandler's Palos Verdes Sand & Gravel Co.

By working down from the top of the 175-ft. bank, the material flows ahead of the DragScraper. This provides bonus loads on each haul and substantially lessens the danger of cave-ins.

Operating cables are powered by a Sauerman three-drum electric hoist. Equipped for rapid shifting, the DragScraper can be quickly positioned to any line of operation between the two tail towers at the top of the bank and the headpost at the hopper.

The plant is the largest sand producer in the South Los Angeles area and, together with two ready-mix plants, keeps 22 ready-mix and 18 dump trucks busy.

The best Sauerman Machine for your plant is governed by the nature of the deposit, location of material, the depth and plant layout. Consult Sauerman engineers about your plant. Their recommendations will be based on fifty years of excavating machinery experience. Ask for Catalog A (DragScrapers). Sauerman News Nos. 149 and 150 describe the above installations in greater detail.

SAUERMAN BROS. INC. 634 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DUROLITE BLOCKS

Enter 270 on card, page 167

Advertising rate per issue:

$10.50 per column inch. Lower rates for larger space used and/or on a contract basis.

Write for rate card.

Closing date:

20th of month preceding date of publication.

PIT & QUARRY
431 S. Dearborn St. Chicago 5, Ill.

BROADCAST

Section

GYPSUM RESEARCH

CHEMICAL ENGINEER

WANTED FOR CALIFORNIA

The experienced gypsum chemist with a practical knowledge of gypsum board and stucco is invited to investigate this position with an expanding integrated West Coast manufacturer of building materials and paperboard packaging.

While a broad background in the gypsum field is required, emphasis will be placed on the ability to apply imagination and creativity to a wide range of formulation and development problems.

The long range expansion program in which this well-established company is now engaged makes this an interesting career opportunity for the qualified person. Please write to present your qualifications and to receive further information.

PERSONNEL MANAGER
P.O. BOX 3611
San Francisco 6, California

POSITION WANTED

Industry executive desires connection with growth potential. Experience includes management positions in sand, gravel, limestone, and ready mix. Presently with multiplant company. Available for interview, National Convention, Chicago, February 10-14.

Box PQ-308-N, c/o PIT & QUARRY
431 S. Dearborn St. Chicago 5, Ill.

SALES ENGINEER WANTED

For plant manager. Must be experienced in crushing, grinding operations, sales promotion in lightweight aggregate. Plant located England, Ark.

Replies confidential.

ARKANSAS LIGHTWEIGHT AGGREGATE CORP.
P.O. Box 1085 El Dorado, Ark.

OPERATING SUPERINTENDENT

Experienced in lightweight aggregate, preferably clay. Must know crushing, grinding, and rotary kiln operations. Plant located England, Ark.

Replies confidential.

ARKANSAS LIGHTWEIGHT AGGREGATE CORP.
P.O. Box 1085 El Dorado, Ark.

CHEMIST WANTED

Large cement company needs chemist or chemical engineer. Write giving details of education, experience, and salary desired. Replies confidential.

PQ-105-A, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

PLANT ENGINEER WANTED

Multi plant cement company needs engineer. Opportunity for training and advancement. Give full details on background. Replies confidential.

PQ-104-A, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

SUPERINTENDENT WANTED

Industrial Sand Plant. Midwest location. State age, marital status, past industrial sand experience, salary expected. List experience with power equipment, blending-classifying methods, drilling, etc. Replies strictly confidential.

PQ-107-A, c/o Pit & Quarry Publications
431 S. Dearborn St. Chicago 5, Ill.

WANTED TO BUY FOR CASH ESTABLISHED QUARRY AND CRUSHED STONE BUSINESS

Reply to:
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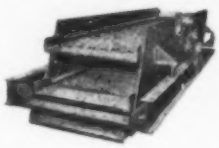
BONDED EQUIPMENT BARGAINS

NEW CURRENT MODELS IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE

NEW BONDED® HEAVY DUTY VIBRATING SCREENS

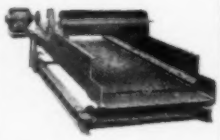
BUY WITH CONFIDENCE, OUR REFERENCES ARE: Ohio National Bank, Columbus, Ohio Dun and Bradstreet



HEAVY DUTY MODELS, TYPE P: Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. **Write for New 8-page Bulletin No. 1087.**

Model Number	No. of Decks	Screening Area	Sale Price
124A	1	2'x4'	$ 443.00
224A	2	2'x4'	472.00
126A	1	2'x6'	472.00
226A	2	2'x6'	501.00
136A	1	3'x6'	581.00
236A	2	3'x6'	688.00
336A	3	3'x6'	958.00
138A	1	3'x8'	675.00
238A	2	3'x8'	815.00
338A	3	3'x8'	996.00
336B	3	3'x6'	1620.00
436B	4	3'x6'	1685.00
138B	1	3'x8'	1510.00
238B	2	3'x8'	1620.00
338B	3	3'x8'	1735.00
248B	2	4'x8'	2310.00
348B	3	4'x8'	2440.00
2410B	2	4'x10'	2400.00
3410B	3	4'x10'	2550.00
2412B	2	4'x12'	2590.00
3412B	3	4'x12'	2970.00
4412B	4	4'x12'	3165.00

NEW BONDED® GENERAL DUTY VIBRATING SCREENS

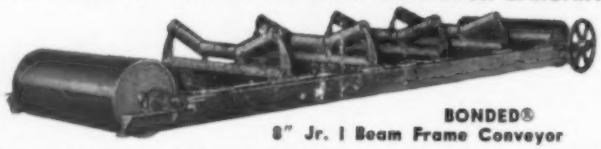


More than 4000 Mines and Quarries have modernized with Bonded Equipment.

GENERAL DUTY SCREENS, TYPE A: Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. **Write for New 8-page Bulletin No. 1086.**

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS



BONDED® 8" Jr. I Beam Frame Conveyor

Complete Pre-Fab sections of 8" Jr. I Beam Frame Conveyors, quickly and easily joined together on the job. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2⅞" diam. shaft. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28-oz. duck, ¼" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers. Bonded Troughing Idler Conveyors also available in Truss Frame Construction. Write for Bulletins #1138 and 1189.

Conveyor Prices Include Belting

Belt Width	Length of Conveyor	List Price	Sale Price	Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	$1397	$ 723	14"	50'	$2222	$1144
14"	85'	3377	1733	14"	125'	4697	2407
16"	20'	1262	636	16"	45'	2137	1068
16"	60'	3662	1359	16"	90'	3712	1900
18"	25'	1477	794	18"	45'	2217	1166
18"	70'	3143	1643	18"	85'	3697	1933
18"	100'	4288	2230	18"	130'	5362	2797
20"	25'	1517	823	20"	60'	2882	1533
20"	75'	3467	1838	20"	90'	4052	2146
24"	25'	1598	898	24"	45'	2430	1330
24"	70'	3480	1875	24"	100'	4740	2514
24"	120'	5540	2950	24"	150'	6840	3603
30"	50'	2911	1617	30"	70'	3871	2119
30"	90'	4631	2614	30"	140'	7231	3852
36"	25'	1618	1118	36"	45'	2585	1678
36"	60'	3638	2096	36"	100'	5718	3214

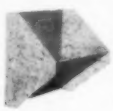
For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting.

For 14" belt, add $16.84 per foot;
For 18" belt, add $19.24 per foot;
For 24" belt, add $21.78 per foot;
For 30" belt, add $27.96 per foot.
For 16" belt, add $18.04 per foot;
For 20" belt, add $20.37 per foot;
For 30" belt, and $24.78 per foot;
Write for Bulletins #1138 and #1189.

NEW BONDED® BUCKET ELEVATORS

Open or Enclosed, Vertical or Inclined Bucket Elevators with Continuous or Spaced Buckets mounted on Chain or Belting. Bonded's standard models mean lower prices and you get a Custom Built Elevator at no extra cost. Prices listed are for vertical enclosed elevators. Open and other types priced on request. There is a style of bucket for virtually every material or condition: wet or dry, lumpy, fine, slivery, granular or pellet shapes, hot or chemically active. (Standard Elevators with Chain mounted buckets use #477 Pintle or #C102B Combination Chain. 4, 5 and 6 ply, 32 oz. or 35 oz. duck belt is used on Belt mounted buckets. **Write for Bulletin #1203.**

BONDED CONTINUOUS STEEL BUCKETS PRICES AT BOTTOM OF THIS AD.



Model No.	Bucket Size Inches	First 20' (Discharge Ht.)	Add or Deduct Per. Ft.
Style "E" Continuous Steel Buckets On Chain			
C85E	8x5x 7¾	$1397.00	$31.25
C126E	12x6x11¾	1589.00	34.25
C108E	10x8x11⅝	1604.00	34.75
C128E	12x8x11⅝	1624.00	35.50
C148E	14x8x11⅝	1710.00	36.75
Style "E" Continuous Steel Buckets On Belt			
B85E	8x5x 7¾	$1727.50	$34.50
B116E	11x6x 8¾	1839.50	38.75
B128E	12x8x11⅝	2013.00	43.50
Style "A" Spaced Malleable Iron Buckets On Chain			
C53A	5x 3½	$1071.50	$20.25
C64A	6x 4	1088.50	21.00
C85A	8x 5	1235.00	25.50
C106A	10x 6	1281.00	27.50
C127A	12x 7	1510.00	31.25
C148A	14x 8	1673.50	36.00
Style "A" Spaced Malleable Iron Buckets On Belt			
B53A	5x 3½	$1099.00	$20.50
B64A	6x 4	1116.50	21.25
B85A	8x 5	1311.50	27.25
B106A	10x 6	1692.50	33.00
B127A	12x 7	1854.50	37.25

CONTINUOUS STEEL ELEVATOR BUCKETS

Bucket Size, Inches	Price Each	Bucket Size, Inches	Price Each
8x5x 7¾	$2.80	12x7x11⅝	$4.53
9x6x 9¼	3.43	12x8x11⅝	4.90
10x5x 7¾	2.94	14x7x11⅝	4.90
10x6x 9¼	3.55	14x8x11⅝	5.27
10x7x11⅝	4.29	16x8x11⅝	5.51
10x8x11⅝	4.53	18x8x11⅝	5.87
11x6x 9¼	3.67	20x8x11⅝	6.18
12x6x 9¼	3.81		

Buckets priced are 12 gauge — medium front — not overlapping. Other sizes, gauges and styles available at equally low prices. **Write for Bulletin #1203.**

NEW IDLERS AND RETURN ROLLS SAVE 25%

3-roll, 5" diameter Troughing Idlers for:

14" belt	$16.50	24" belt	$21.25
16" belt	19.25	30" belt	32.00
18" belt	20.50	36" belt	32.75
20" belt	20.75	48" belt	35.50

1-roll, 5" diameter Return Idlers for:

14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable pre-lubricated sealed ball bearings. Also can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Bonded Rubber Disc Impact Idlers priced from $61.00. **Write For Bulletin #1138.**

NEW BONDED® FEEDERS

For high tonnage and controlled feed of Aggregate, Sand, Gravel, Crushed Stone, Clay products, Metallic Ores, Coal, Cinders and almost any other bulk material to Crushers, Screens, Conveyors, Mills and other process machinery. Feeder may also be driven from tail shaft of Bonded Troughing Idler Conveyors, thus eliminating the necessity of two motors. All models available in abrasion resistant alloy steel plate. Capacities to 440 tons per hour. **Write for Bulletin #1211.**

Priced from $295.00

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213, HU. 6-3184**

110 Bellevue — **Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders** — **COLUMBUS 7, OHIO**

BONDED EQUIPMENT BARGAINS

MILES OF RUBBER BELTING

- SAVE UP TO 30% FROM ONE OF AMERICA'S LARGEST JOBBERS OF QUALITY TESTED* RUBBER BELTING
- **NO INCREASE IN PRICES. WE PAY FREIGHT ON SHIPMENTS OF CONVEYOR BELTING 200 POUNDS OR OVER, VIA CHEAPEST METHOD OF TRANSPORTATION**
- FAST TURNOVER ASSURES YOU OF FRESH STOCK
- AS CLOSE AS YOUR PHONE — IT'S IN STOCK

Phone: Columbus, Ohio, HIckory 4-2186 — Days; AXminster 1-2213 or HUdson 6-3156 — Evenings and Holidays

* All rubber belting is tested by the Engineering laboratory of the College of Engineering at one of the largest universities in the United States. All rubber belting is quaranteed to meet or exceed in quality the listed specifications.

Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.

Heavy duty 4-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, refined sugar, salt, coke, earth and similar materials when abrasion is not to severe.

Width	Ply	List Price Per Ft.	Sale Price Per ft.
14"	4	$3.63	**$2.83**
16"	4	4.08	**2.97**
18"	4	4.51	**3.29**
20"	4	4.97	**3.80**
24"	4	5.85	**4.26**
30"	4	7.18	**5.21**
36"	4	8.51	**6.18**

Major Bee Brand: 16# to 19# Average Friction Pull. 2500# to 3000# Average Cover Tensile.

A high grade of heavy duty 4 and 5-ply, 28-oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges. Skim coat between plies.

Width	Ply	List Price Per Ft.	Sale Price Per ft.
14"	4	$..4.31	**$3.08**
16"	4	4.85	**3.46**
18"	4	5.39	**3.83**
20"	4	5.90	**4.37**
24"	4	6.94	**4.94**
30"	4	8.53	**6.07**
36"	4	10.09	**7.35**
24"	5	8.14	**5.78**

Major Bee-x Brand: 20# to 24# Average Friction Pull. 3500# to 4000# Average Cover Tensile.

A heavier duty 28-oz. duck belt with 1/8" top rubber cover x 1/32" bottom rubber cover. For the higher abrasion resistance applications and handling of materials where more strength is required to give greater belt life. Skim coat between plies.

Width	Ply	List Price Per Ft.	Sale Price Per ft.
16"	4	$5.48	**$3.78**
18"	4	6.10	**4.20**
20"	4	6.68	**4.79**
24"	4	7.87	**5.41**
30"	4	9.70	**6.65**
24"	5	9.11	**6.31**

Other widths, plies, duck weights and cover thickness available at low prices. Write for Free Sample.

BUY WITH CONFIDENCE. OUR REFERENCES ARE: Ohio National Bank, Columbus, Ohio, Dun and Bradstreet

BONDED SCALE AND MACHINE COMPANY

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DEISTER 5x14 3-deck Plat-O Vibr. Screen, like new. $8,500 Yard.
SECO 4x10 2-deck Screen, good. $1,000 Yard.
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1905 Railway Exchange Bldg., St. Louis 1, Mo.

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Cedarapids 2540 jaw only. Being rebuilt.
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27½ ton, single-compartment 8' x 12' bin.
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Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also conveyor belting.

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Lorain 82 2-yard diesel shovel.
Lorain 79-J 1½ yd. diesel dragline.
Lorain 79 1½ yd. diesel shovel.
P&H 655B 1½ yd. diesel dragline.
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1—Euclid 3200 gallon water tank semi-trailer.
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1—Caterpillar DW-10 with Athey side dump.
1—Allis Chalmers HD-19 tractor with hydraulic bulldoser blade.
1—International 900 tractor, with loader, backhoe.
1—International TD-14A tractor with PCU.
1—International TD18 with Bucyrus-Erie bulldoser blade. Excellent condition.
1—Caterpillar D-4 with Bimco front loader.
1—Caterpillar D-7 with cable bulldoser blade.
1—Caterpillar D-8 with cable bulldoser blade.
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1—Adams diesel powered grader.

SHOVEL ATTACHMENTS

Lorain 820, 9-yd., 22' boom, 21' stick.
Lorain 50, 1-yc., 21' boom,, 17' stick.
Lorain 40, ¾-yd. 18' boom, 16' stick.
Lorain 30A, ⅜-yd., 16' boom, 13'4" stick.
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BACKHOE ATTACHMENTS

Lorain 40A, 18' boom, 7' stick, 36", 36" or 44" bucket.
Koehring 304, 19'10" boom 5'6" stick, 38" bucket.

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Cat. D7700, 74 H.P. at 1000 PFM. Rebuilt.
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GMC Twin Diesel, rebuilt.
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CLAM SHELL BUCKET: Williams 1¼ yd. capacity, excellent condition.

JAW CRUSHER: 10 x 15, 10 x 20, 12 x 24, 15 x 36, 24 x 36, 25 x 40, 30 x 42 and 40 x 42. One 18 x 30" sectionalized for underground use.

COMPRESSORS: One Ingersoll Rand PRE-2, 780 H.P., 4500 CFM, 2200 volts. One Ingersoll Rand PRE-2, 500 H.P., 2500 CFM, 2200 volts. One Chicago Pneumatic OCE, 300 H.P., 1500 CFM, 2200 volts. One Joy WN-14 Radial model F, 300 H.P., 2300 volts, 1825 CFM. One Ingersoll Rand XRE, 11 x 12 and 19 x 12, 175 H.P. synchro motor, 300 RPM, with 5 step clearance control.

Above machines are complete with all necessary auxiliary equipment.

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ROTARY COOLERS: 104"x30', 104"x70', Submerged Type.
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1—American Hoist #18676L with 14" diameter 12# face drums with D/D Lidgerwood attached swinger #1359, mounted on skids with plate for mounting engine.

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Bantam	"M-49"	⅜ yd. Trench Hoe, mounted Reo 6x6.
Insley	"K-12"	½ yd. Dragline or Trench Hoe. Reconditioned.
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Byers	"83"	⅝ yd. Used Dragline, 40' Boom.

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Caterpillar	"D-4"	Diesel Tractor w/Traxcavator Hydraulic Front End Loader. Rebuilt engine & tracks.
Allis-Chalmers	"TLW"	Used Tractor w/Tractomotive Front End Loader, ⅝ yard.
International	"TD9"	Diesel Tractor w/Bucyrus-Erie Dozer-Loader.
Barber-Greene	"545W"	Used Rubber-Tired Bucket Loader.
Pettibone	"10"	Used 1-Yd. Gas Tractor-shovel, 3 years old.

MISCELLANEOUS

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Universal	"916RR"	Jaw Crusher @ $750.
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- 5—4' x 30' Beaird Dryers, Motors & drvs
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- 1—Penna Size D Crusher Hammermill
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- 1—Bucyrus-Erie Model 15 B Crane, ½ yd.
- 2—Insley K 12 Backhoes, ½ yard
- 1—Bay City 30 ton Truck Crane
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Manitowoc Shovels, 2½ yd. to 5 yd.
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other equipment available not listed above.

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1—D-8800 Caterpillar diesel, 4-cyl., 98 HP, with starting engine, clutch, outboard bearing.

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3—AMERICAN HOIST & DERRICK COMPANY double-drum Dragscraper Hoists, 5000# line pull @600 FPM on rear drum 12,000# line pull @250 FPM on front drum. Silent chain drive. Two equipped with 125 HP electric motors. One equipped with 150 HP Hercules diesel engine. Will sell with or without power for fraction of new price.

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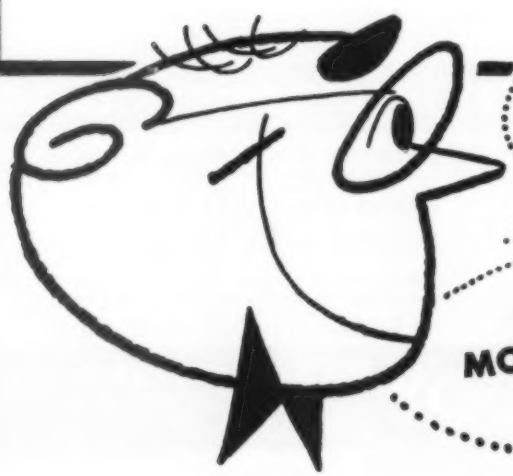

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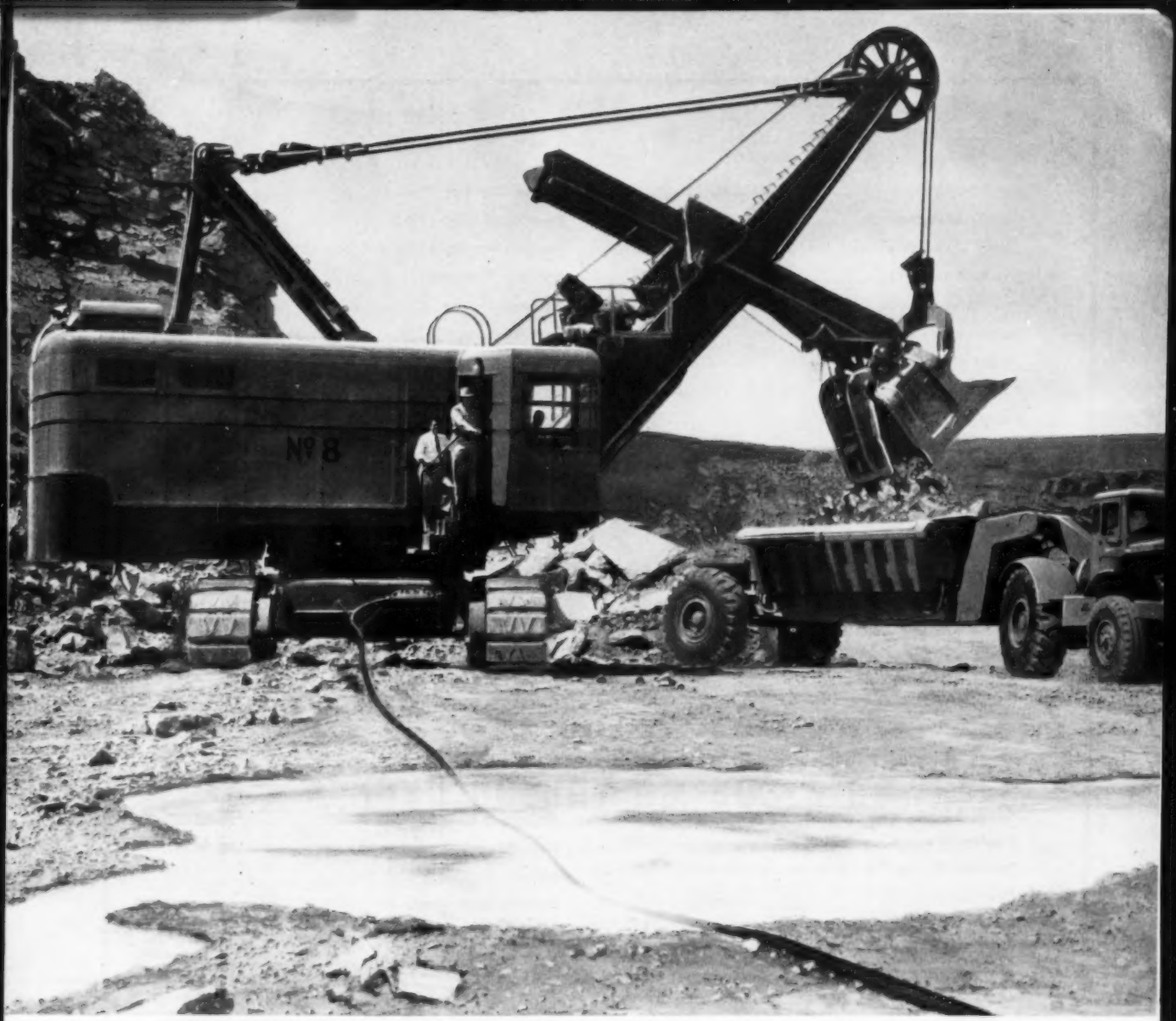

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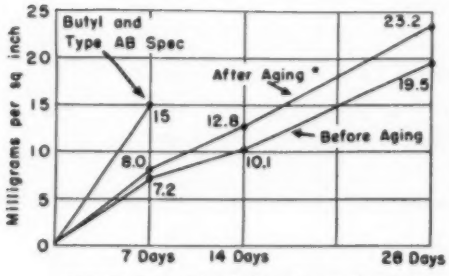

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WIRE ROPE AT WORK

This tall skyscraper of the mining country is the headframe of the "A" Shaft, Mather Mine, operated by The Cleveland Cliffs Iron Co., Ishpeming, Mich. Sunk deep into the earth beneath the headframe are the shafts for the two balanced skips and the man-and-materials cage.

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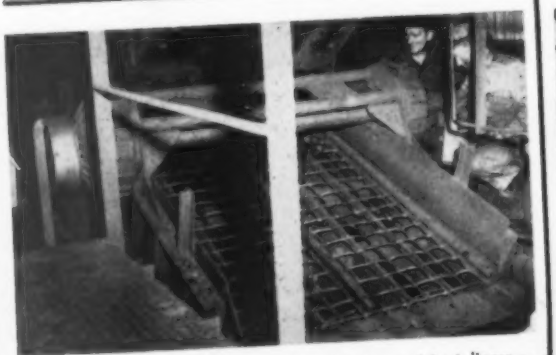
Producers demand 'em because they size uniformly, cut costs, boost production



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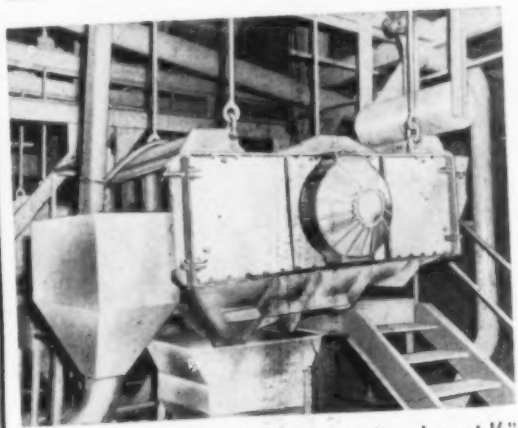

Suspended Gyroset 3' x 6' scalping oyster lime slurry at 1/8" opening, for a large cement company.

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- Only 2 Bearings
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- Taper lock fly wheel bushing for assured tightness and ease of maintenance.

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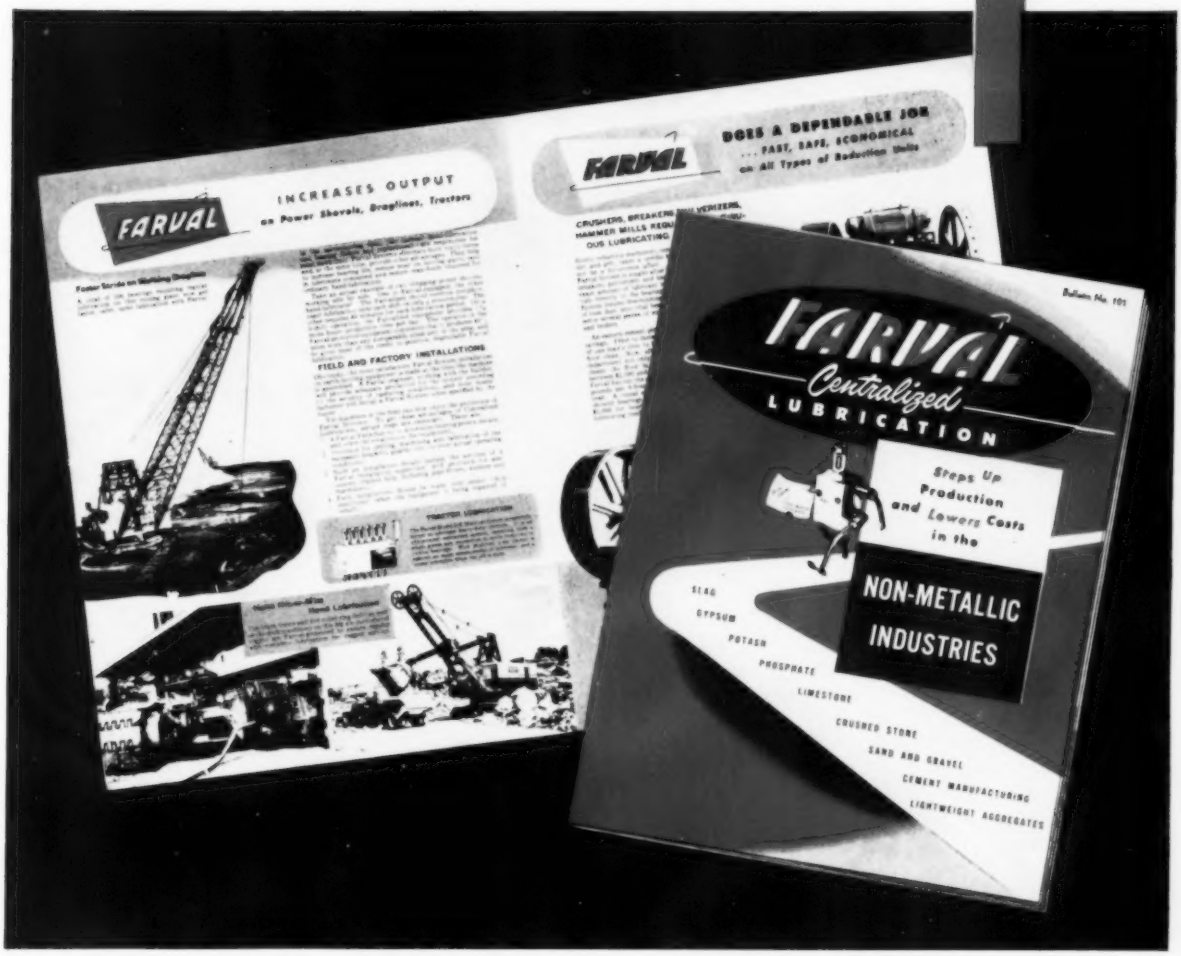

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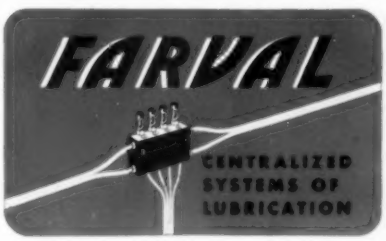

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QUIZ

For Multiwall Bag Buyers

"How Does Your Packaging Operation Rate?"

1 Is your bag correctly sized for your product?
2 Is your bag properly constructed for your product?
3 If loss of product is caused by deterioration, would special protective sheets help to reduce such loss?
4 Is the total cost of your bag out of proportion to the selling price of your product?
5 Does your product cost warrant redesigning your bag to merchandise your product more effectively?
6 Are you using the most economical filling machine available for packaging?
7 Are your current suppliers giving you the service you desire?
8 Are your suppliers integrated and capable of maintaining dependable service at all times, under all conditions?
9 Are your suppliers' representatives qualified to help you with your packaging, sales promotion and marketing?

Perhaps we may be able to help you to arrive at the right answers in order to achieve higher production at lower costs.

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